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GENERAL INFORMATION

VOLUME 2
1953
LITERATURE

AVIATION MEDICINE

AN ANNOTATED BIBLIOGRAPHY

By
Arnold J. Jacobius
Madeleine J. Wilkins
Ludmila Kassianoff
Rita B. Slie
Sam L. Whitehead

Bibliography Section
Science and Technology Division
The Library of Congress

Published by the
AERO MEDICAL ASSOCIATION
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PREFACE

This second volume of the Aviation Medicine Bibliography has been prepared by the Bibliography Section of the Science and Technology Division in the Library of Congress under Government Order NAonr-31-58 and is being published under the auspices of the Aero Medical Association. It is hoped that this channel of publication will secure wider distribution and make the bibliography available to those who are most vitally interested in the information it contains. While format and style of Volume I have been largely preserved in this compilation, a few changes have been made.

Scope

The considerable increase in size has been partly due to the fact that the over-all volume of Aeromedical literature has been augmenting steadily during the past years. Furthermore, for the first time, a number of Russian and other Slavic-language items have been included. Unfortunately, attempts to secure Russian books and articles dealing with aviation medicine proper have been unsuccessful, and the majority of abstracts refer to fringe areas, many to secondary sources; they have been included, however, on the basis of their interest value. In addition to the 1953 literature contained in this cumulation, a number of 1952 references which had not been included in the first volume have been incorporated.

Subject coverage extends over the following broad areas:

1. History and General Aspects of Aviation Medicine:
   History of aviation medicine from its beginnings to date---General organization---Organization by countries---Meetings and congresses---Individual schools, laboratories and institutions---Societies.

2. Aviation Physiology:
   Physiological effects of acceleration, rotation, speed, vibration, altitude, anoxia, explosive decompression, noise, heat and cold, climatic factors, illumination and glare, physical exercise, fatigue, oxygen breathing, pressure breathing, and age---Body measurements---Respiratory functions in aviation---Perceptual physiology, including visual, auditory, tactile perception, and proprioception, color vision, brightness discrimination, visual acuity, form perception, eye and ear examination techniques, and pitch and loudness discrimination---Spatial orientation---Reaction time---Psychomotor performance.

3. Pathology and Pharmacology of Aviation:
   Decompression sickness---Motion sickness---Aerotitis media---Burns---Miscellaneous diseases related to aviation---Drugs and their effects on pilot functions---Effects of various substances (e.g., alcohol, CO, CO_2, deodorants, etc.).

4. Aviation Psychology:
   Psychological effects of airplane flight---Mental stress in aviation---Anxiety in aviation---Alertness and vigilance---Personnel attitudes---Learning---Retention and transmission of messages---Leadership---Speaking and speech.

5. Preventive Medicine and Sanitation:
   Nutrition of aviators---In-flight feeding---Immunization of personnel and passengers---Hospital facilities at airports---Sanitation in aircraft---Dental care of aviators---Air transportation of patients.

6. Special Problems in High-Altitude and Space Flight:
   Protective equipment---Altitude and anti-g suits---Helmets and harnesses---Glasses and goggles---Warning devices---Oxygen equipment---Bailout and bailout equipment---Physiological factors in high-altitude, high-speed, rocket, and space flight---Planetary life conditions---Cosmic and ultraviolet rays and their physiological effects.

7. Miscellaneous Problems:
   Survival and rescue of aviators---Accidents and accident prevention---Various operations (radio, radar, range finding, etc.)---Human engineering aspects of aircraft, aircraft components, and controls---Personnel and personnel selection---Classification, rating, and training of personnel---Personnel performance---Duties related to aviation medicine.

Arrangement, Type, and Form of Abstracts

In style, arrangement, type, and form, the abstracts follow closely those of the first volume. In

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AVIATION MEDICINE
An Annotated Bibliography
Volume 2, 1953 Literature

CORRECTION

Through a regrettable oversight, the Canadian source of sponsorship and guidance for this task has been erroneously stated in the Acknowledgments (on page v of the preface) to be the Royal Canadian Air Force, instead of the Defence Research Board as it should be. The first two sentences should therefore read:

Acknowledgments

This bibliography is being compiled under the sponsorship and guidance of the U. S. Air Force, the U. S. Navy, and the Defence Research Board of Canada. We wish to express our gratitude to the representatives of these agencies, Dr. Harold Wooster of the Directorate of Research Communications, U. S Air Force, Captain Norman L. Barr, MC, USN, Director of the Astronautical Division, Bureau of Medicine, U. S. Navy, and Mr. Lauchlan F. MacRae, Director, Scientific Information Service, Defence Research Board, Canada.

the second volume, all entries are identified by item numbers and are listed under these numbers in the indexes (cf. below). Abstracts the primary source of which was not available are identified by an asterisk.

Indexes

Cumulated corporate-author and subject indexes, combining the entries of volumes I and II, have been prepared. The names of secondary authors, instead of being incorporated in the main body of the book as in the first volume, have been indexed separately at the end of the volume. The subject index has been considerably expanded. A great number of new, more specific terms have been added, and the number of cross-references has been increased for the greater convenience of the reader. References in the bibliography are identified by item numbers (cf. below). In order to enable the reader to trace references in Volume I, a key has been supplied which refers from the old (author-year) to the new (numerical) item designation.

Availability symbols

As in the preceding volume, availability of materials is indicated by library or report-collection symbols (in capital letters), followed by a control number. The symbols are as follows:

*AD	ASTIA Document: available at ASTIA (Armed Services Technical Information Agency), Arlington Hall Station, Arlington 12, Virginia.
*ATI	Air Technical Index: available at the same place.
DLC	Library of Congress, Washington 25, D. C.
DAFM	Armed Forces Medical Library: (now changed to National Library of Medicine (see below).
DNLM	National Library of Medicine, Washington 25, D. C. (formerly Library of the Surgeon General [DSG], then Armed Forces Medical Library [DAFM]).
PB	Publication Board: for sale by the Office of Technical Services, Department of Commerce, Washington 25, D. C.
*TIP	Technical Information Pilot: available at ASTIA (see above).

Acknowledgments

This bibliography is being compiled under the sponsorship and guidance of the U. S. Air Force, the U. S. Navy, and the Royal Canadian Air Force. We wish to express our gratitude to the representatives of these agencies, Dr. Harold Wooster of the Directorate of Research Communications, U. S. Air Force, Dr. Norman L. Barr, Captain, U. S. Navy, and Wing Commander Jack C. Wickett, R. Canadian Air Force. Special thanks are due to Mr. Frank J. Bertalan, Deputy Executive Assistant for Scientific Information, Office of Naval Research, and to Dr. Robert J. Benford, Editor of the Journal of Aviation Medicine and representative of the Aero Medical Association, for their assistance and counsel. We owe particular appreciation to Dr. Roman Kenk for his contribution in compiling the subject index and to Mr. Richard A. Barlow, who has prepared the cover design. Special acknowledgment is due to the clerical members of the staff who have done valuable work in the preparation of final copy, particularly to Miss Mercedes Cain, Mr. Leroy D. Davis, Mr. Aaron S. Dann, Miss Eugenia M. Henry, Mrs. Vernadine Hierst, Mrs. Beatrice T. Treese, Mrs. Virginia K. Sims, and Mrs. Alice Prendable. Finally we wish to express our appreciation to the staff members of the National Library of Medicine and of the Armed Services Technical Information Agency for their kind assistance.

Journal Title Abbreviations

The abbreviations used herein for journal titles are intended to save space without sacrificing ready recognition. Minor words such as articles and prepositions, and occasionally parts of long titles have been omitted, and the words and names occurring most frequently in titles are abbreviated. The following is a key to the title word abbreviations used:

Acad.	Academy	Jour.	Journal
Acoust.	Acoustic		
Aeronaut.	Aeronautical	Lab(s).	Laboratory(-ies)
Amer.	America(n)	Laryngol.	Laryngology
Arch.	Archives		
Assoc.	Association	Mag.	Magazine

*) Available on loan to members and contractors of the Department of Defense only.

Bacteriol.	Bacteriology
Brit.	British
Bull.	Bulletin
Canad.	Canadian
Coll.	College
Compar.	Comparative
Corp.	Corporation
Dept.	Department
Dermatol.	Dermatology
Div.	Division
Elec.	Electrical
Endocrinol.	Endocrinology
Eng.	Engineering
Exper.	Experimental
Gaz.	Gazette
Gynecol.	Gynecology
Hyg.	Hygiene
Inc.	Incorporated
Indus.	Industrial
Inst.	Institute
Med.	Medicine, Medical
Nat.	National
Ophthalmol.	Ophthalmology
Otol.	Otology
Otolaryngol.	Otolaryngology
Pathol.	Pathology
Physiol.	Physiology
Proc.	Proceedings
Psychol.	Psychology
Quart.	Quarterly
Rev.	Review
Sci.	Science
Scient.	Scientific
Soc.	Society
Surg.	Surgery
Tech.	Technical
Univ.	University

BIBLIOGRAPHY

919

Anonymous 1953

DUMMY TAKES BEATING FOR SCIENCE'S SAKE. — Aviation Week, 58 (2): 29-30. Jan. 12, 1953. DLC (TL501. A8, v. 58)

An anthropomorphic dummy is described, which is designed to record the stresses which human personnel would undergo were they involved in crashes similar to those to which the mannikin is subjected. The proportions of the dummy are the same as the average of naval aviation cadets trained during World War II. Its height is 5 feet and 9 inches, and it weighs 154 pounds. Its "flesh" is foam and sheet rubber and attached to the metal skeleton; bundles of elastic cords, simulating muscles, are anchored to the metal bones. Most of the major joints of the body are reproduced, and the joints can be adjusted to varying degrees of friction so that, if desired, the dummy can be made to retain the posture it held during the crash; this is of value for analytical purposes. Also, the skeleton is designed to hold accelerometers and test instruments.

920

Anonymous 1953a

[THE MEDICAL SERVICE IN THE ITALIAN ARMED FORCES]. Le service de santé militaire au sein des forces armées italiennes. — Bulletin international des services de santé des armées de terre, de mer et de l'air (Liège), 26 (10): 379-400. 1953. In French. DNLM

The history of the aeromedical service in the Italian Armed Forces is summarized and the training program for flight surgeons outlined. The aeromedical service is under the Inspectorate of Health of the Department of Aeronautical Defense, headed by the Surgeon General. It consists of the Secretariat of the Bureau of Research, in charge of the Center of Study and Research in Aviation Medicine, and of three other departments, two of which are technical and one administrative. These three departments are in turn subdivided into sections dealing with special fields. The leading research center is the Medico-Legal Institut of Aeronautics in Rome.

921

Anonymous 1953b

TECHNIQUES AND MATERIALS FOR THE DISINSECTIZATION OF AIRCRAFT. — Bulletin of the World Health Organization (Geneva), 8 (4): 527-533. 1953. In English. DNLM

Results of investigations directed towards an improvement of techniques for the disinsectization of aircraft arriving at international airports in the U.S.A. (which vary to some extent from those recommended by the World Health Organization for worldwide use) are discussed. General testing techniques and the materials used are described, and the effectiveness of lindane vapors is outlined. The aerosols S-112A, S-140A, S-134A, and G-1013 were found to be much more effective against the domestic fly than G-382. DDT proved to be practically ineffective. Lindane vapors (emitted from glass wool impregnated by lindane acetone solutions and mounted in the ventilation system) destroyed nearly all free-flying houseflies. Toxic hazards to passengers must yet be determined before this method can be recommended for general use.

922

Anonymous 1953c

SUITED FOR SAFETY. — Flying Safety, 9 (5): 5. 1953. DLC (UG633. F55, v. 9)

Notes on the new T-1 altitude suit assembly are given. The suit assembly under research for seven years at the Aero Medical Laboratory at the Air Research and Development Command's Wright Air Development Center has been successfully tested to sustain life at 106, 000 ft. in altitude chambers. The assembly includes an anti-g component, communication equipment, oxygen valves and regulators, a protective helmet, a visor with defrosters, and an oxygen bailout cylinder.

923

Anonymous 1953d

THE BREATH OF LIFE. — Flying Safety, 9 (7): 7. 1953. DLC (UG633. F55, v. 9)

A brief account of the D-1 oxygen regulator or ("Automatic Positive Pressure Diluter Demand Oxygen Regulator") is given. A D-2 model, now in the testing stage, is intended to sustain life at altitudes up to 80, 000 ft. when used with the T-1 high-altitude suit.

924

Anonymous 1953e

RIDING THE RAILS. — Flying Safety, 9 (7): 8-9. 1953. DLC (UG633. F55, v. 9)

A brief illustrated description is presented of an ejection seat designed for training purposes and tested at Frankfort Arsenal. The portable testing unit was developed to acquaint air personnel with the knowledge of the procedures required to free oneself from the cockpit and to simulate the sensations experienced during ejection from an operational aircraft at high altitudes and speeds.

925

Anonymous 1953f

SUIT FOR SURVIVAL. — Flying Safety, 9 (7): 18-19. 1953. DLC (UG633. F55, v. 9)

A short outline of rules to follow in making the M-4 anti-exposure flying suit watertight is given.

The method of donning the suit is described. Accessory equipment and special hints to aid survival in water or in extreme cold are mentioned.

926

Anonymous 1953g
YOUR POINT OF VIEW. — Flying Safety, 9 (10): 8-9. 1953. DLC (UG633. F55, v. 9)

Until the results of present research on airplane visibility are analyzed and suitable design features are incorporated into aircraft, the pilot is advised to remember the limitations of his own cockpit, and enlarge his field of vision by rotating his head.

927

Anonymous 1953h
UNDER PRESSURE. — Flying Safety, 9 (11): 6-8. 1953. DLC (UG633. F55, v. 9)

A short, illustrated description of the indoctrination course in high-altitude safety at Craig Air Force Base is given. It is believed that by making qualified air personnel experience hypoxia and observe hypoxic reactions in others, the importance of oxygen and the use of accessory equipment will be greatly impressed upon them.

928

Anonymous 1953i
EJECTION PROCEDURES. — Flying Safety, 9 (12): 14-15. 1953. DLC (UG633. F55, v. 9)

Variations in ejection seat procedures for nine different aircraft are given.

929

Anonymous 1953j
BOARD CERTIFICATION IN AVIATION MEDICINE. — Jour. Aviation Med., 24 (1): 1-2. 1953. DLC (TL555. A1A4, v. 24)

On February 8, 1953, the American Board of Preventive Medicine was authorized by the Council on Medical Education and Hospitals of the American Medical Association, upon the recommendation of the Advisory Board for Medical Specialties, to grant specialty certification to physicians who are properly qualified in aviation medicine.

930

Anonymous 1953k
COMMITTEE ON PILOT AGING. — Jour. Aviation Med., 24 (1): 2-3. 1953. DLC (TL555. A1A4, v. 24)

The Report of the President's Airport Commission, headed by General James Doolittle, stated the advisability of a study of pilot aging. The Aero Medical Association, in cooperation with the Department of Commerce, has appointed a committee to study this problem.

931

Anonymous 1953l
ROCKET FLIGHTS OF MAMMALS TO 200, 000 FEET. — Jour. Brit. Interplanetary Soc., 12: 7-9. 1953. DLC (TL790. A1B7, v. 12)

Essentially the same as the paper, Henry, J. P., 1952.

932

Anonymous 1953m
THE AIRBORNE "RESCUATOR". — Med. Technicians Bull., 4: 8-9. Jan.-Feb., 1953. DNLM

The Military Air Transport Service has a special respirator ("rescuator") for adult polio victims. The chamber is full size and provides ventilation for the limbs and torso. The unique feature of the apparatus is that it weighs only 150 pounds. Aeromedical specialists have averaged two rescue missions a week with the respirator since January 1, 1952.

933

Anonymous 1953n
CERTIFICATION IN AVIATION MEDICINE. — Military Surgeon, 112 (4) : 300-302. 1953. DLC (RD1. A7, v. 112)

The newly introduced recognition of aviation medicine as a certified specialty is discussed. The action was taken by the American Medical Association's Council on Medical Education and Hospitals, climaxing a five-year campaign on the part of aeromedical leaders. The group to supervise aeromedical practice, teaching and research is the American Board of Preventive Medicine, which also grants certificates in the related field of public health. The sponsoring organizations, beside the A. M. A., include the American and Canadian Public Health associations, the Association of Schools of Public Health, the Southern Medical Association, and the Aero Medical Association. In addition to the usual requirements for certification--a medical degree from an approved school of medicine, internship in a recognized hospital, two years of graduate study, a two-year residency, and not less than two years of teaching or practice --the aeromedical specialist will have to participate in "regular and frequent" aerial flights.

934

Anonymous 1953o
[AVIATION MEDICINE EXHIBITION, NAPLES, SEPTEMBER 20-OCTOBER 15, 1953] Mostra di Medicina Aeronautica, Napoli 20 Settembre-15 Ottobre 1953. — Rivista di medicina aeronautica (Roma), 16 (3): 408-442. 1953. In Italian. DLC (TL555. A1R5, v. 16)

Illustrated panels, in part executed by artists of renown, are reproduced and described, and brief outlines of the materials they depict are presented, such as the lives and contributions to aviation medicine of notable Italians (Leonardo da Vinci, Giovanni Alfonso Borelli, Gian Francesco Cigna, Angelo Mosso, Giuseppe Gradenigo, Amedeo Herlitzka, Renato Donati, Padre Agostino Gemelli, and Mario Pezzi). A group of striking posters present the main topics aviation medical science is concerned with, such as: the earth's atmosphere, effects of high altitude, anoxia, vestibular reactions to flight, acceleration, blackout, protection against heat and cold, aviation accidents, hazards from toxic agents, bailout, sanitary contraindications against flight, interna-

tional sanitary regulations, protection of the eye, dark adaptation, aero-embolism, fatigue, "fascination" in pilots, the sound barrier, and space flight.

935

Anonymous 1953p

SAVE PILOTS IN CRASHES. — Sci. News Letter, 63 (13): 206. 1953. DLC (Q1.S76, v. 63)

A description of a shoulder harness, seat belt, and gravity reel combination for low-level crashes is given. The safety device was developed by F. E. Weick, director of the Personal Aircraft Research Center at Texas A. and M. College, College Station, Texas.

936

Anonymous 1953q

ALCOHOL AND THE FLYER. — U. S. Air Force Medical Service Digest, 4 (11): 19. 1953. DNLM

A non-technical note is presented on the time required for complete elimination of alcohol from the body. The rate of oxidation of ethyl alcohol remains constant, irrespective of the quantity consumed. The presence of very small amounts of alcohol in the body may affect judgment and influence reflexes which are of utmost importance in high speed flights. Attention, concentration, memory, and reason may also be affected.

937

Anonymous 1953r

[AEROMEDICAL RESEARCH.] — U. S. Air Force Medical Service Digest, 4 (12): 1-28. 1953. DNLM

The entire issue is devoted to various aspects of aeromedical research and to the progress of aviation due to these research efforts. The articles are short and of a general nature and cover history, procedures in developing research projects, and current research activities at major military installations. Some aspects of clinical and dental research are mentioned.

938

Anonymous 1953s

ANOXIA: PILOT'S NARRATIVE OF AN ANOXIA EXPERIENCE. — U.S. Navy Med. News Letter, 22 (8): 36-40. 1953. DNLM

A pilot's account of a 50-min. flight up to 30,000 ft. under severe anoxia is presented. Contributing factors to either unconsciousness or semi-consciousness, in addition to lack of oxygen, were an over-heated cockpit resulting in hyperventilation and a faulty cabin pressurization system. In an appended note, the pilot reports on a 35-min. period in a decompression chamber, in which conditions simulating a climb to 43,000 ft. were investigated. On descent to 32,000 ft., hyperventilation was attempted; at 30,000 ft. the oxygen mask was removed for 1 min.; and at 20,000 ft. the mask was removed for 5 minutes. Hyperventilation at 32,000 ft. (simulated) produced some dizziness; removal of the mask for one minute caused dulling of sensations, and later, removal resulted in the same sort of feelings which had been experienced previously during actual flight at 30,000 ft.

939

Abbott, B. C., and B. Bigland 1953

THE EFFECTS OF FORCE AND SPEED CHANGES ON THE RATE OF OXYGEN CONSUMPTION DURING NEGATIVE WORK. — Jour. Physiol. (London), 120 (3): 319-325. 1953. DLC (QP1.J75, v. 120)

An apparatus was designed so that a bicycle ergometer could be driven backwards by a motor at controlled speeds and the subject could resist the motion of the pedals with known forces. Ventilation rates and oxygen consumptions were measured when the subject performed different rates of negative work: (a) at constant force, and (b) at constant speed. When the rate of negative work was increased at constant speed the rate of oxygen consumption increased rapidly. But when the rate of work was increased at constant force, by varying the speed of pedalling, the oxygen consumption remained relatively constant. These results can be explained by the force-velocity relationship of active muscle during stretch and by the number of fibres employed in each type of work. (Authors' summary)

940

Aberg, U. 1953

[AUDIOLOGICAL ASPECTS OF HEARING REQUIREMENTS FOR FLYING PERSONNEL] Audiologiska aspekter på hörselkrav for flygande personal. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (2): 10-13. 1953. In Swedish. DNLM (W1.SW387, v. 2)

Older methods of auditory testing in flying personnel have involved the use of conventional audiograms; however, the audiogram has never allowed for the noise conditions which are encountered in actual flight. The author proposes that an "understandability index" be used which utilizes the number of sounds perceived when presented under acoustic conditions simulating flight. Using two telephone systems, all sound frequencies above a chosen frequency F_0 are eliminated from one of the systems; in the other, all sound frequencies below F_0 are eliminated. An optimum frequency is determined in the experiment, at which sounds from both systems are understood by sender and receiver, and extraneous sounds are relegated to the background. This forms the basis for the "understandability index".

941

Aberg, U. 1953a

[NOISE AND NOISE PROTECTION] Buller och bullerprofylax. — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (2): 14-19. 1953. In Swedish. DNLM (W1.SW387, v. 2)

This survey article is concerned with the trau-

matic effects of high-intensity noise upon the human ear. Numerous investigations have indicated that exposure to noise levels of 95 db. for a period of years can cause chronic damage and hearing loss. At an intensity of 110 db., acute damage can occur, which, however, usually regresses after a short time, leaving a permanent decrement of hearing ability in the exposed ear. Sound intensities above 110 db. cannot be withstood without some form of ear protection. Using simple ear defenders, a decrease of 40 db. can be achieved when exposed to high-intensity noise. Further decrease is not easily obtained because of bone conduction.

942

*Abramovich, K. G. 1952

[CARBOGEN-OXYGEN THERAPY IN OCCUPATIONAL DISEASES DUE TO HYPOXEMIA] Karbogeno-kislorodnaîa terapiîa professional'nykh zabolevaniĭ, sviazannykh s gipoksemieĭ. — In: Kislorodnaîa terapiîa i kislorodnaîa nedostatochnost'. Kiev, 1952, p. 208-214. In Russian.

Inhalations of a mixture of oxygen and carbon dioxide ("Carbogen") proved to be very effective in a number of cases of severe intoxication, where the pulmonary tissue had been preserved from toxic action. In these cases, hypoxia, hypocapnia, weakening of respiration, and drop of the vascular tonus are observed in the tissues. Carbogen inhalation is absolutely indicated, as it stimulates the function of the respiratory and vasculo-motor centers, increases the blood supply of the brain and heart, contributes to the normal utilization of oxygen by the tissues, and influences the regulation of metabolism through the central nervous system. Several cases of poisoning from CO, methanol, and H_2S are described. The gaseous composition of the patients' blood was measured 10-20 min. before and after carbogen inhalation with subsequent stay in the oxygen tent. It is also suggested to inject the Carbogen subcutaneously or rectally, in which case it is absorbed faster than parenterally. Oxygen is administered by inhalation (tent, mask, or nose cannula): after one-hour treatment, the percentage of oxygen in the arterial blood, as well as the arterio-venous oxygen difference increases. [Abstract in: Sovetskoe meditsinskoe referativenoe obozrenie, Vnutr. bolezni, 1953 (13): 45. DNLM (ZW1.qS729)]

943

Achiary, 1953

Petit, and Chalard

[USE OF THE HELICOPTERS FOR THE TRANSPORTATION OF PHYSICIANS AND OF THE SICK OR WOUNDED IN THE MOUNTAINS] L'emploi de l'hélicoptère pour le transport en montagne de médecins, de malades ou blessés. — Concours médical (Paris), 75 (39): 3219-3222. 1953. In French. DNLM

The difficulties and advantages of using helicopters for evacuation of patients in mountainous regions are pointed out, and specifications as to speed, maximum ceiling, fuel load, passenger capacity, and general performance are listed. Helicopters offer a great economy in time, as compared to the automobile, greater comfort, and a better possibility of reaching the place of an accident. In view of the great expenses involved, however, it is concluded that for ambulance service alone, helicopters would be unprofitable. But as a government service, and applied to a variety of missions, it makes itself pay.

944

Ackerman, E., 1953

J. J. Reid, H. Kinsloe, and H. W. Frings

BIOLOGICAL EFFECTS OF HIGH-INTENSITY SOUND WAVES. — Pennsylvania State College, State College (Contract AF 33(038)-786); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-82, Jan. 1953. v+51 p. (RDO no. 695-63). AD 26 848 UNCLASSIFIED

Studies on the effects of high frequency and high intensity sounds on bacteria and living animals and cells carried out by the Departments of Physics, Bacteriology, and Zoology and Entomology are described. The following items are discussed: (1) high intensity sources (sirens, whistles, loudspeakers and magnetostriction vibrators), (2) apparatus and methods for accurately measuring intensities and frequencies of the sound to which specimens are exposed, (3) procedures for irradiating specimens under test, (4) studies on low frequency cavitation, (5) the construction of barium titanate probe microphones, (6) the construction of electrokinetic probe hydrophones, and (7) a study on hearing. Effects of vibratory energy on microorganisms, microorganisms employed and microbiological techniques are investigated, and studies are described of the effects of high intensity sonic radiation on (1) audiogenic seizures in mice, (2) protozoa, (3) embryos, (4) gene mutation in Drosophila, and (5) physiological effects on mice: skin growth, hearing impairment, and fertility. (Authors' abstract, modified)

945

Adair, E. R. 1953

DURATION AND LIGHT-DARK RATIO OF INTERMITTENT PREADAPTATION AS FACTORS INFLUENCING HUMAN DARK ADAPTATION. — Jour. Optical Soc. Amer., 43 (1): 22-27. 1953. DLC (QC350.O6, v. 43)

The influence of intermittent preadaptation upon subsequent dark adaptation was investigated for six preadaptation durations ranging from 30 seconds to 16 minutes. The rate of intermittence was one cycle per second, and four ratios of light-to-dark (plus continuous light) were used. The preadaptation intensity was 1188 mL. The resulting dark adaptation curves show that an increase in the duration of intermittent preadaptation produces an elevation in initial threshold, a prolonging of dark adaptation, and a decrease in the rate at which dark adaptation proceeds. An increase in the light-time of the light-dark ratio will affect dark

adaptation in a similar manner. (Author's abstract)

946

Adams, J. A. 1952

THE INFLUENCE OF THE TIME INTERVAL AFTER INTERPOLATED ACTIVITY ON PSYCHOMOTOR PERFORMANCE. — State Univ. of Iowa, Iowa City (Contract AF 33(038)-13214); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 52-11, March 1952. vii+7 p. (Project no. 509-020-0006). TIP U22529 UNCLASSIFIED

Information was sought on the nature of the process that weakens an originally learned response (OL) during the subsequent acquisition of the antagonistic response (IL). It was hypothesized that this reduction in OL response strength results from a process similar to that underlying experimental extinction and that spontaneous recovery of the OL response would occur between the end of IL and the relearning of the original response (RL). A total of 84 subjects performed on a Revised Complex Coordination Test, Model D. Each of four experimental groups had a different time interval between the end of IL and the beginning of RL. These intervals were: 2 minutes, 10 minutes, 30 minutes, and 4 hours. Two control groups were employed to evaluate warm-up effects. A third control group was used to evaluate possible gains attributable to work effects. The results indicated that spontaneous recovery of the OL response probably occurred in the IL-RL time interval but that it was countered by warm-up effects. The results were analogous to Underwood's findings in verbal learning (Jour. Exper. Psychol., 38(4): 429-439. 1948). (Author's summary)

947

Adams, J. A., and B. Reynolds 1952a

ROTARY PURSUIT PERFORMANCE AS A FUNCTION OF INITIAL LEVEL OF ABILITY [Abstract]. — Amer. Psychologist, 7 (7): 261. 1952. DLC (BF1.A55, v. 7)

The interaction between individual differences and distribution of training on the rotary pursuit has been investigated. Two groups of 480 basic trainee airmen were differentiated on the basis of intertrial rest. Trials were 20 seconds in duration with either 5 or 60 seconds intertrial rests; twenty trials comprised a session with 30 minutes rest between sessions. Massed subjects were given four sessions and distributed subjects (stratified into deciles on the basis of their cumulative scores) were given three sessions. Results in both groups indicate that the rate of acquisition and final level of performance are positively related to the initial level of ability. In the Distributed Group it was noted that: (1) no marked interaction was found between initial level of ability and the form of the acquisition curves; (2) there is a tendency for loss of proficiency between sessions with the highest and lowest groups; with the intermediate groups there is a consistent loss and never any gain between sessions. In the Massed Group it was observed that: (1) performance curves during the first session tend to be linear for the low decile groups while high decile groups show performance curves with marked negative acceleration; (2) for all sessions after the first, the lower decile groups show greater between-session reminiscence; and (3) the amount of warm-up decreases with the number of sessions with the rate of decrease being greater with higher decile groups. (Abstract, modified)

948

Adams, J. A. 1953

THE PREDICTION OF PERFORMANCE AT ADVANCED STAGES OF TRAINING ON A COMPLEX PSYCHOMOTOR TASK. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-49, Dec. 1953. iv+44 p. (Project no. 509-020-0003). AD 22 724 UNCLASSIFIED

The research reported was a laboratory investigation on the problem of predictability of psychomotor performance at an advanced stage of practice. Basic airmen were given extensive training on a complex psychomotor test which served as the criterion task. Fifty-five other tests were administered to evaluate the classes of tests that best predict performance at advanced stages of training on the criterion task. They consisted of three batteries: (a) printed tests, (b) briefly administered simple psychomotor tests, and (c) complex psychomotor tests. It was found that printed tests, simple psychomotor tests, and measures from the initial stage of training on the complex psychomotor tests generally did a poorer job of predicting final performance than initial performance on the criterion task. This was consistent with other research findings. However, measures from final stages of training on the complex psychomotor tests did a better job of predicting final than initial criterion task performance. (From the author's summary)

949

Adams, J. C. 1953

DEVELOPMENTS IN AVIATION MEDICINE. — In: Roddis, L. H., and J. L. Schwartz. The History of the Medical Department of the United States Navy in World War II, v. 1, p. 209-212. Office of the Surgeon General (Navy), Washington, D. C., 1953. DLC (D807.U6A53, v. 1)

Prior to World War II no provision had been made for training naval flight surgeons. At the outset of the war, an emergency situation developed which demanded the establishment of a naval school of aviation medicine with an active program for aviation medical training and research. On November 29, 1939, such a school was organized at the Naval Air Station, Pensacola, Fla. Civilian educational and research institutions were encouraged to participate in pertinent continuing research programs. Cooperation and exchange of information with Great Britain and Canada vastly

increased the scope of research problems. New operational programs were initiated as a result of research on aviation medicine. They included equipment design units, air evacuation units, and a flight nursing corps. The immediate aim of the aero medical program of the Navy became one of supporting aviation wherever and whenever possible.

950

Adams, S. 1952
EFFECT OF EQUALITARIAN ATMOSPHERES UPON THE PERFORMANCE OF BOMBER CREWS [Abstract]. — Amer. Psychologist, 7 (7): 398. 1952. DLC (BF1. A55, v. 7)

As a part of a larger testing program, incomplete sentences blanks were given to members of bomber crews. The blanks included a number of stems designed to elicit attitudes toward structure of status and authority. Officer attitudes were assumed to be the primary determinants of the atmosphere of the crew; hence officer responses to the critical stems were used as indicators of the degree of equalitarianism or authoritarianism existing on the crew. Coefficients of reliability of agreement on responses to the seven critical stems ranged from 0. 65 to 0. 95. Significant differences were found between crews in the number of equalitarian responses obtained on the stems. In a class consisting primarily of below-average crews, a moderate correlation (0.38) was found between equalitarian atmosphere and instructor rating on "present value to the Air Force". A second class of relatively good crews showed a correlation of 0.40 between authoritarian atmosphere and rating on present value. These findings suggest the hypothesis that tolerance for authoritarian atmospheres on bomber crews is related to the level of training and quality of performance of the crews. (Author's abstract, condensed)

951

Adelson, M. 1953
A METHOD FOR STUDYING HUMAN TRACKING BEHAVIOR. — Univ. of Illinois, Urbana. (Contract AF 33(038)-25726); issued by Human Resources Research Center. Pilot Training Research Lab., Goodfellow Air Force Base, Tex. Research Bulletin 53-50, Dec. 1953. iii + 7 p. (Project no. 508-017-0001, Task D). AD 23 139
UNCLASSIFIED

An apparatus is described which may be used to study several large classes of problems related to tracking performance. The cursory descriptions of experimental procedure given are intended merely to indicate how application of this apparatus may be made to the problems in question. These problems include, among others, the learning and transfer of tracking skills, and the effects of the factors which influence tracking behavior. (From the author's summary)

952

Ades, H. W. 1953
ORIENTATION IN SPACE. — In: Benox report: an exploratory study of the biological effects of noise, p. 64-72. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685
UNCLASSIFIED

Observations on ground crews working in the vicinity of jet engines, and acoustic experiments in the siren chamber involving human and animal (cats) test subjects, have lead to the following conclusions: (1) The vestibular apparatus is the first sensory system affected by noise after the auditory; (2) in the frequency range of 300-3000 c. p. s., the thresholds for vestibular stimulation are approximately 135-140 decibels for the unprotected ear, and 155 db. for the protected ear; the most sensitive part of the range is 1000-1500 c.p.s.; (3) manifestations of equilibratory and postural disturbance include vertigo, nausea, nystagmus, visual field shifting, feeling of forced movement (away from the sound source), staggering, and falling; (4) at intensity levels below 155 db. the route of entry is the ear; beyond that level ear defenders are no longer effective; (5) it is probable that at frequencies below 300 c.p.s. sound levels above 140 db. will severely affect proprioceptive and tactile perception with consequent distortion of activity of postural mechanisms; and (6) no chronic dysfunction due to intense sound has been observed.

953

Aero Medical Association 1953
AVIATION TOXICOLOGY. — x+120 p. New York: The Blakiston Co., Garden City, 1953. DLC (RC1075. A35)

This handbook was designed to supply information on known or suspected toxic effects of agents encountered in aircraft operation, and to describe experiments on and analyses of the more critical materials in current use. The time-concentration curves of toxicity included in this book have a practical application in industry. The variability of toxic effects with high altitude is demonstrated in manifestations of visual impairment (e.g., light-intensity discrimination and flicker fusion frequency performance), changes in pulse rate, and hemoglobin transport mechanisms. Mention is made of the use of drugs to alter circulatory processes and thus alleviate toxic effects. Methods of expressing gaseous concentrations in relation to altitude are given. One of the appendices contains toxicity data for specific compounds. Maximum allowable concentrations of volatile materials are listed. (75 references)

954

(Aeronaut. Res. Council) 1953
THE BIOLOGY OF FLYING: REPORT OF A SYMPOSIUM HELD AT THE BRITISH ASSOCIATION MEETING IN BELFAST, SEPTEMBER, 1952. — Aeronautical Research Council (Gt. Brit.) Engineering Physics Sub-Committee, London. Report no. E.P. 240, May 21, 1953. 15p. AD 23 124
UNCLASSIFIED

The papers which are included deal with the

problems encountered in civil flying, the physiological problems in flying high-performance military aircraft, skill and the airman, and the engineering problems of conditioning aircraft for human occupation and control.

The following individual papers have been abstracted separately:

Bergin, K. G., 1953
Hick, W. E., 1953
Rendel, D. G. A., 1953
Stewart, W. K., 1953

955

(Air Force) 1953
PHYSIOLOGY OF FLIGHT. — Department of the Air Force, Washington, D. C. Air Force Manual no. 160-30, July 1953. ii+196 p.
DLC (UG633. A3763)

The manual is designed to acquaint flying personnel (particularly flight surgeons) with physiological stress phenomena encountered during high-altitude flight. The following aspects are reviewed: the physical characteristics of the atmosphere which alter physiological processes in high-speed flight; maintenance of human life during flight; and survival in the event of bailout. The bases for the treatment of physiological stress resulting from flight are discussed in detail. Several types of equipment used for body protection during flight are described and illustrated. The importance of training of personnel is stressed with particular regard to survival conditions. A bibliography is included which covers topics on aeromedical problems. Numerous drawings, tables and diagrams are given.

956

(Air Force) 1953a
MEDICAL SERVICE: ADMINISTRATIVE MANUAL USAF MEDICAL TREATMENT FACILITIES. — Department of the Air Force, Washington, D. C. Air Force Manual no. 160-20, Sept. 15, 1953. vi+285 p. DLC (UH463. A52)

A plan for organization of Air Force hospitals is presented. The functions of the administrative officers of the hospitals and the types of professional services to be included are outlined and the duties of each service described. Eligibility requirements for members of the Armed Forces and their dependents are given. Forms to be filled for medical treatment and ways of recording pertinent data are described.

957

(Air Proving Eglin) 1953
THE CLIMATIC HANGAR: A DESCRIPTIVE BOOKLET. — Air Proving Ground Command, Eglin Air Force Base, Fla. June 17, 1953. 31 p.
AD 20 793 UNCLASSIFIED

Scope and construction of the climatic hangar erected at Eglin Air Force Base, Florida, are outlined, and the special test equipment and layout are described. The hangar includes a hot test room (for temperatures between 70° and 165° F. and relative humidities varying between 10% and 95%), a cold test room (for temperatures from 95° to -70° F.), a jungle test room provided with a rain system, a tropic-marine test room equipped with a salt spray and a rain making system, and a desert test room, in which cycling night and day desert conditions can be simulated.

958

(Air Proving Eglin) 1953a
OPERATIONAL SUITABILITY TEST OF THE MARK IV CONTINUOUS-WEAR ANTI-EXPOSURE SUIT. — Air Proving Ground Command, Eglin Air Force Base, Fla. Letter Final Report. July 1953. 17 p. (Project no. APG/CSC/224-C).
AD 16 299 UNCLASSIFIED

The Mark IV suit which is designed to provide protection to aircraft members in the event of bailing out over water, was tested to determine its suitability for tactical use under arctic and temperate winter conditions. The suit was found to provide adequate protection at -56° F. It does not impose excessive restrictions on the wearer. The Mark IV boots provide foot protection in low temperatures if mild exercise is taken. The suit with a hood is capable of maintaining body comfort for 2 hours in subfreezing water (28° F.) at air temperatures as low as -40° F. The time required to don the suit is excessive. The inner liners are not correctly sized, and a hood is not provided to protect the head and neck in low temperatures. The material of which the outer garment is made is easily snagged and torn. The Mark IV suit, as tested, is not entirely suitable for use by aircrew members in winter conditions. A report of immersion tests is appended. (AD abstract)

959

(Air Proving Eglin) 1953b
EVALUATION OF GRADUATES OF THE K BOMBING SYSTEM COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, July 28, 1953. 33 p. (Project no. APG/SAS/125-A). AD 19 727 UNCLASSIFIED

Airmen students entered the K-Series System Mechanic Course directly from basic training and received 21 weeks of training in electronics fundamentals and 19 weeks of training on the maintenance of K-series bomb-navigation systems. Graduates were competent at flight line inspection and maintenance of the systems installed in aircraft. They possessed adequate background knowledge of theory and operation of the K system, but required about a year of working experience before becoming eligible for upgrading in skill level from apprentice to senior mechanic. The course training was adequate except in areas involving maintenance of the AN/APQ-23 radar system, use of test equipment, systematic methods of trouble shooting, and use of technical order files. (AD abstract)

960

(Air Proving Eglin) 1953c
EVALUATION OF GRADUATES OF PARACHUTE

RIGGER COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Sept. 29, 1953. 16p. (Project no. APG/CSC/267-A). AD 19 729 UNCLASSIFIED

The parachute rigger course was evaluated by measuring the ability of graduates to perform the job for which they were trained: the inspection, repair, cleaning, packing, and testing of parachutes and the repair, cleaning, and adjustment of the equipment used. Graduates also issued parachutes and briefed personnel on their correct use. The graduates satisfactorily met the course objective and had qualifications adequate for utilization by operating activities. No areas of over-training were apparent. About 6 months experience was necessary before the graduate apprentice was upgraded to senior parachute rigger. Practical experience in parachute rigging prior to the formal training appeared to be of no appreciable benefit to the student. (AD abstract)

961

(Air Proving Eglin) 1953d
EVALUATION OF GRADUATES OF AIRFRAME REPAIRMAN COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Oct. 16, 1953. 31 p. (Project no. APG/CSC/259-A). AD 21 593 UNCLASSIFIED

The Airframe Repairman Course is one of the basic technical courses conducted in the Air Force technical training program. The graduate's duties, qualifications, capabilities, and limitations are discussed in detail. In addition, the average group performance ratings are tabulated and the procedures and results analyzed. The Airframe Repairman Course produces a graduate who is competent to perform most of the duties required of him at an apprentice level of skill. With the exception of some subjects the graduate's background training is adequate. In certain areas over-training exists. The primary deterrent in the course is a lack of student interest and incentive for aircraft sheet-metal work. It is recommended that a study be made of the problem of interest and incentive of students in the Airframe Repairman Course. (Author's conclusions, modified)

962

(Air Proving Eglin) 1953e
OPERATIONAL SUITABILITY TEST OF THE TYPE XB-5 HARNESS AND PACK WITH TYPE XC-10 PARACHUTE CANOPY. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Oct 16, 1953. 20 p. (Project no. APG/CSC/261-A). AD 20 961 UNCLASSIFIED

The test item resembles the present standard backstyle parachute assembly, but is considerably lighter and incorporates certain canopy design changes. Test results indicated that the type XB-5 harness and pack with the type XC-10 parachute canopy will be operationally suitable for use by crew members of military aircraft when the sluggish opening qualities after cold soaking are corrected. It is recommended that corrective action be taken to insure that the opening qualities at low temperatures will be satisfactory, and that investigation be made of a quick or automatic release for the parachute harness that will permit the wearer to remove quickly the parachute assembly while seated in the aircraft cockpit. (AD abstract)

963

(Air Proving Eglin) 1953f
EVALUATION OF GRADUATES OF AIRCRAFT MECHANIC, MEDIUM JET BOMBER COURSE. — Air Proving Ground Command, Eglin Air Force Base, Fla. Final Report, Dec. 11, 1953. 24 p. (Project no. APG/SAS/131-A). AD 23 900 UNCLASSIFIED

Training in the aircraft mechanic, medium jet bomber, course was evaluated by measuring the ability of graduates to perform the work for which they were trained. The course consisted of 75 academic days of training in the operating principles of the B-47 and its systems; procedures for inspection, service, and maintenance of the B-47; and types and uses of tools and ground equipment used by the aircraft mechanic. Six airmen who had received basic and technical military training were selected to provide an academic cross-section of the class. Data were obtained from these men. General conclusions were that the graduates were competent apprentice-level aircraft mechanics capable of performing their required duties. Additional instruction should be provided in procedures for fuel transfer and torqueing fittings in the fuel system. The course provided more instruction than necessary in theory of electricity and operation of electrical components, methods of hydraulic system trouble shooting, methods of electrical trouble shooting, fabrication of tubing assemblies, and engine start, run-up, and operational checks. A recommendation is made to consider the feasibility of additional instruction and drill in cockpit familiarization and in ground crew procedures during aircrew preflight inspection. (AD abstract)

964

Airapet'îants, E. S., and V. N. Zvorykin 1952
[RECEPTOR IMPULSES FROM THE BLADDER, INTESTINE AND STOMACH UNDER CONDITIONS OF HYPERCAPNIA] Receptsiîa mochevogo puzyrià, kishechnika i zheludka pri gipercapnii. — Voprosy fiziologicheskoĭ interotseptsii (Moskva & Leningrad), 1: 24-36. 1952. In Russian. DNLM (W1. V0627, no. 1)

Under conditions of hypercapnia, animal reactions in response to exteroceptive stimuli are known to be inadequate: under CO_2 intoxication dogs are indifferent to pain or emotional stimuli. Varied mechanoreceptors of the bladder, stomach, and intestine were stimulated in 18 cats (by air or water inflation) under conditions of hypercapnia induced by inhalation of air containing 4.8 to 19% CO_2, and respiration and blood pressure were registered. Results showed that small quantities of CO_2 (about 5%) affect the interoceptive reflexes

only after distinct alterations in respiration and blood pressure have occurred (in response to high CO_2 content). Inhalation of air containing 10% and more CO_2, during light narcosis animal reactivity intact, nearly always alters the character of interoceptive reflexes: in slight hypercapnia and at the start of strong hypercapnia these reflexes are increased; during continued strong hypercapnia, or if inhalation of CO_2-enriched air is repeated, interoceptive reflex reactions become nearly always inhibited or disappear completely. These changes can be explained by the action of hypercapnia on the nervous centers, first stimulating, then inhibiting. Thus, hypercapnia induces the distortion of interoceptive as well as exteroceptive reflexes.

965

Airapet'îants, E. S., 1952a
and V. N. Zvorykin
[RECEPTOR IMPULSES FROM THE BLADDER AND INTESTINE DURING OXYGEN WANT IN THE ORGANISM] Retseptsîâ mochevogo pusyrîâ i kishechnika pri kislorodnom golodanii organizma. — Voprosy fiziologicheskoĭ interotseptsii (Moskva & Leningrad) 1: 37-50. 1952. In Russian.
DNLM (W1.V0627, no. 1)

The influence of hypoxia on interoceptive reflexes in response to the stimulation of mechanoreceptors in the bladder and chemoreceptors in the small intestine was studied in 20 cats under uretan narcosis. The animals inhaled hypoxic air (15, 10.1 or 4.3% of oxygen) during 3 to 40 minutes through a tracheal cannula. Results showed that hypoxemia alters the reflex reactions of these receptors. Slight hypoxemia increases the interoceptive reactions, which in turn increase the rate and amplitude of respiration and raise the arterial blood pressure. A medium degree of hypoxemia, however, usually depresses, severe hypoxemia always inhibits interoceptive reactions. Interoceptive stimulations during repeated or severe hypoxemia are very detrimental to the animal and may cause its death.

966

Albaum, H. G., 1953
and H. I. Chinn
ENZYME STUDIES IN ACCLIMATIZATION TO HIGH ALTITUDES. I. BRAIN METABOLISM DURING ALTITUDE ACCLIMATIZATION. — Brooklyn Coll., N. Y. (Contract AF 33(038)-15884); and School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+7 p. (Project no. 21-1201-0009, Report no. 1). AD 11 864 PB 109601

Acclimatization of 16 adult rats to simulated altitudes of 11,000, 18,000, and 22,000 ft. for 1 to 3 months did not significantly alter the levels of key chemical constituents of the brain, although the hemoglobin level rose markedly at 18,000 and 22,000 ft. The following fractions were determined for experimental and control groups: inorganic P; phosphocreatine; organic P; glycogen; lactic acid; adenylic acid; adenosine diphosphate (ADP); adenosine triphosphate (ATP); hexose diphosphate; glucose-1-phosphate; and diphosphopyridine nucleotide. The brain of rats that breathed N for 3 minutes exhibited a decrease of ATP, ADP, phosphocreatine, organic P, and glycogen and an increase in inorganic P, lactic acid, and adenylic acid. No cytochrome oxidase change or alteration in the rate of P^{32} incorporation into ATP was apparent after acclimatization. (AD abstract)

967

Albaum, H. G., 1953a
W. K. Noell, and H. I. Chinn
ENZYME STUDIES IN ACCLIMATIZATION TO HIGH ALTITUDES. II. CHEMICAL CHANGES IN RABBIT BRAIN DURING ANOXIA. — Brooklyn Coll., N. Y. (Contract AF 33(038)-15884); and School of Aviation Medicine, Randolph Field, Tex. June 1953. iii+6 p. (Project no. 21-1201-0009, Report no. 2). AD 16 360 PB 109233

Changes in metabolite concentrations of various portions of the rabbit brain were determined during progressive stages of anoxia and correlated with electrical measurements of function. Disappearance of function and the inexcitability of all measurable elements during anoxia were associated with a moderate decrease of adenosine triphosphate (ATP), phosphocreatine, and glycogen. Disappearance of ATP was more rapid than that of phosphocreatine. Loss of spontaneous electrical activity during early stages of anoxia occurred before significant changes in chemical constituents could be detected, if the experimental animals were compared to unanesthetized controls. Urethane controls, on the other hand, had a higher level of ATP than the unanesthetized animals. There was a significant decrease during all stages of anoxia. The different regions of the forebrain showed no differences in ATP level nor in depletion under anoxia. This level, however, was lower in the mesencephalon and the medulla, and depletion occurred more slowly. (Authors' summary and conclusions)

968

Albaum, H. G., 1953b
and H. I. Chinn
BRAIN METABOLISM DURING ACCLIMATIZATION TO HIGH ALTITUDE. — Amer. Jour. Physiol., 174 (1): 141-145. 1953.
DLC (QP1.A5, v. 174)

969

Albaum, H. G., 1953c
W. K. Noell, and H. I. Chinn
CHEMICAL CHANGES IN RABBIT BRAIN DURING ANOXIA. — Amer. Jour. Physiol., 174 (3): 408-412. 1953. DLC (QP1.A5, v. 174)

Same as the report, Albaum, H. G., 1953a.

970

Albert, J. 1953
AIR EVACUATION FROM KOREA: A TYPICAL FLIGHT. — Military Surgeon, 112 (4) : 256-259. 1953. DLC (RD1.A7, v. 112)

A personal account of a U. S. Air Force nurse describing an air evacuation trip of casualties

from the Korean front to the rear is presented: "... The wounded are gently carried aboard on litters and fastened in their proper spot: head injury up front, in the position third from the top, so you can give him oxygen or plasma easily; paraplegic opposite him, so that his drainage will function properly; a man whose left leg is amputated is placed on the floor, so there is enough room for the large round hoop holding the skin traction in place; a patient with a spica-cast is also placed on the floor; a man with hepatitis in the top position, since he won't need much nursing care during the flight; and so on until you have all 30 patients on board. You check all patients, give a hypo for pain, readjust pillows made from Mae Wests or blankets, change a dressing, check litter straps, brief the patients about the flight as to destination, time in flight, altitude. Only when you are ready does the pilot signal to start engines and once again you are winging toward Japan." (p. 258)

971

Alekseeva, A. M. 1952
[ON THE CREATINE PHOSPHATE CONTENT IN THE BRAIN] O soderzhanii kreatinfosfata v mozge. — Biokhimiia (Leningrad), 17 (1): 119-122. 1952. In Russian. DNLM

The "labile" phosphorus content in the brain was studied in rats. A method was developed by the author, consisting in quick refrigeration of the brain in situ by liquid air. Up to 50% of the creatine in the brain was found to be combined with phosphorus, forming a much more labile compound than that encountered in the muscles. The creatine content drops sharply under the influence of hypoxia, anemia or trauma. Creatine phosphate disappears during the first minute after death; it can only be preserved by the above method.

972

Alexander, H. M. 1953
TOMORROW'S AIR AGE. — 248 p. New York: Rinehart and Co., Inc., 1953.
DLC (TL515.A54)

The author states for the layman facts and theories about present-day aviation. The report incorporates some valid predictions for the future, based on analyses of available data on aircraft design, speed, and altitude. Of particular interest are the chapters related to medical problems of high-altitude and high-speed flight.

973

Alexander, I. E., 1952
and F. J. Githler
CHRONIC EFFECTS OF JET ENGINE NOISE ON THE STRUCTURE AND FUNCTION OF THE COCHLEAR APPARATUS. — Jour. Compar. and Physiol. Psychol., 45 (4): 381-391. 1952.
DNLM

Using the Preyer reflex as an index of normality, guinea pigs with normal hearing were subjected for a 15 minute period to the noise generated by a jet engine. The ambient sound level at cage distance from the engine was in excess of 140 db. for a measurable frequency band between 25 and 7,500 cycles per second. After 6-8 weeks, the ears of the guinea pigs were tested for electrical and histological changes. An audiogram loss of 34 db. was observed for the entire group; and, histologically, the exposed ears showed a primary area of damage to the cochlea at a distance of 6-12 mm. from the basal end. From the investigations conducted in this experiment, it was concluded that the entire cochlea was involved in the trauma of the exposure to the jet engine. Jet engine noise was found to be a serious occupational hazard.

974

Alexander, J. D. 1953
THE EFFECTS OF MODERATE HYPOXIA ON GLOMERULAR AND TUBULAR FUNCTION OF THE DOG. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+9 p. (Project no. 21-1201-0001, Report no. 1). AD 23 041
PB 112702

Four groups of dogs were acutely exposed to moderate hypoxia and their responses compared during a control period and a post-hypoxic period. These four groups consisted of (a) "normal" dogs, (b) dogs acclimatized to an altitude of 21,000 feet, (c) dogs under augmented antidiuretic hormone stimulation, (d) dogs pre-fed potassium and infused with high concentrations of potassium. The results indicate: (1) The renal hemodynamic response of the acclimatized and unacclimatized dogs to hypoxia is similar. (2) The acclimatized animals appear to be in a state of increased sodium and water deficit. (3) Both the animals acclimatized to altitude and those at ground level respond to acute hypoxia with an increased excretion of sodium, potassium, and water. In the former group anion excretion is different, chloride being lost instead of bicarbonate. The acclimatized dogs failed to produce the alkaline-urine characteristic of the normal dogs. (4) Increased antidiuretic hormone stimulation results in decreased renal plasma flow, sodium, potassium, chloride, and water excretion during hypoxia. The filtration fraction and urinary pH are increased during the exposure to 8 percent oxygen. (5) Acute hypoxia in the potassium-infused animals resulted in tubular secretion of the cation. (Author's summary and conclusions)

975

Alexander, L. T., 1952
and P. D. Bricker
FIGURE-GROUND CONTRAST AND BINOCULAR RIVALRY. — Jour. Exper. Psychol., 44 (6): 452-454. 1952. DLC (BF1.J6, v. 44)

The rate of alternation in binocular rivalry may be related to the degree of figure-ground contrast of stereoscopic fields. In order to investigate this relationship, five stereograms, differing in degree of figure-ground contrast, were presented to five subjects. No reliable systematic relationship was found although a trend in this direction is indicated. It was suggested that the higher intersubject variability found in this experiment was due to the in-

fluence of massing of the trials. (Authors' abstract, modified)

976

Allard, A., 1953
and P. Maurice
[STUDY OF THE RESULTS OF SYSTEMATIC AUDIOMETRIC EXAMINATIONS OF FLYING PERSONNEL OF AN AIRLINE COMPANY] Etude des résultats des examens audiométriques systématiques du Personnel navigant d'une Compagnie de transports. —Médecine aéronautique (Paris), 8 (1) : 67-77. 1953. In French.
DLC (TL555. M394, v. 8)

The clinical value of audiometric tests carried out every six months on the personnel of the Belgian Sabena airline is discussed. Results of the tests are evaluated according to the following occupational categories of the crew: pilots, navigators, radio operators, mechanics, stewarts, and hostesses. The analysis of these results is complicated by the discrepancy in flight hours in airplanes of various types. Among the 82 pilots examined in the age groups of 25 to 40, 43 presented normal audiograms both at the beginning and the end of the test; in the other cases there was a range of variation between "on the job" and "final" audiometric tests. In older pilots, having hearing deficiencies during flight, the left ear was usually affected. Pilots, over 45 years of age, could not perceive higher frequencies (between 8152 and 11, 584 c.p.s.). Among the rest of the flying personnel, radio operators displayed the most marked auditory changes; in this category, even the minimal auditory deficiency became gradually worse with additional flight duty. Their auditory impairment was usually more noticeable in the lower frequencies (between 1024, 2040, and 2896 c.p.s.). No major impairment was seen in the other categories due to improvements of flying conditions, such as pressurization, sound-proofing, etc.

977

Allen, L. R. 1953
SPEECH CORRECTION IN PILOTS. Military Surgeon, 113 (1): 65-66. 1953.
DLC (RD1. A7, v. 113)

The effects of dental plates on speech were studied and vocal and consonantal patterns related to plate shapes. The findings were applied towards the improvement or elimination of speech defects among pilots, radio operators, control tower operators, and other Air Force personnel. This work is carried out at the School of Aviation Medicine, Randolph Field, Texas.

978

Allen, W. J., 1953
and E. W. Clarke
DESIGN OF ELECTRICALLY HEATED FLYING CLOTHING: GENERAL NOTES WITH APPENDIX ON RESULTS OF EXPERIMENTS WITH SOME ELECTRICAL HEATING ELEMENTS. — Flying Personnel Research Committee (Gt. Britain), Report no. FPRC 856. 6 p. Nov. 1953 DNLM

The need for protecting the extremities against cold has made it advisable to include heating circuits in gloves and boots. For greatest heating efficiency, it is suggested that the heating circuits should be connected in parallel. Use of graphite in the construction of the electrical units is recommended. It is further suggested that a one-piece overall should be worn above the partial-pressure, air-ventilated anti-g suit.

979

Alluisi, E. A., 1952c
and G. S. Harker
TARGET SIZE AS A CUE TO DISTANCE IN BINOCULAR STEREOSCOPIC RANGE FINDING [Abstract]. — Amer. Psychologist, 7 (7): 394. 1952. DLC (BF1. A55, v. 7)

The role of target size as a cue to distance in binocular stereoscopic range finding was examined. Targets of three physical sizes were used: twice, unit, and half-size photographic reproductions of a playing card. In Phase I, two test series of rangings "without knowledge" were made by each subject on each card size. In Phase II, two series of rangings were made by each subject on each of six card-size distance combinations. The subjects ranged on four targets "with correct knowledge", and on the remaining two targets "with erroneous knowledge". The following results were noted: (1) In Phase I, the large card was ranged in the theoretically predicted direction 36 times in 48; the small card 19 times in 48. The absolute differences between the means were not significant. (2) In Phase II, the mean rangings "with correct knowledge" occurred in the theoretically predicted direction 31 times in 48; those made "with erroneous knowledge", 30 times in 48. The absolute differences between means for targets suspended at the same physical distance were not significant. (3) Including both phases, these differences ranged from 5 to 71 mm. It is concluded that target size is an insignificant cue to distance in binocular stereoscopic range finding. (Abstract, abbreviated)

980

Alluisi, E. A., 1953
and G. S. Harker
THE STEREOPTOMETER: A SIMPLE HAPLOSCOPIC INSTRUMENT FOR THE STUDY OF BINOCULAR SPACE PERCEPTION. — Science, 117 (3051): 682-683. June 19, 1953.
DLC (Q1. S35, v. 117)

In order to study the functions involved in binocular stereoscopic range finding, it was necessary to develop a simpler laboratory instrument which would simulate visual tasks of range finding and be adaptable for use in the laboratory as well as in the field. A haploscopic-type instrument was considered most appropriate since it provided a simulated reticle field for comparison with an actual field of vision. In the pilot-model stereoptometer, two reflex gun sights were used: one was mounted rigidly to a base, the other on a bearing allowing rotation in a horizontal arc. The tangent of the angle of rotation was found on a dial gage calibrated 9, 060 in. from the center of the point of rotation. As the movable sight was rotated the point of intersection of the two reticle beams

changed. The range then was calculated as follows: $\frac{9.060 \times (\text{interpupillary base estimate})}{\text{gage reading}}$. The instrument permits fusion of right and left beams into a single image when both reticle patterns are the same. In the case of dissimilar patterns, binocular summation or interocular acuity are simulated. Since this is a case of unsymmetrical vergence it would seem desirable to construct an instrument which would provide symmetrical vergence of reticle images.

981

Altukhov, G. V., 1952
and V. B. Malkin
[STUDY OF THE INFLUENCE OF SEVERE OXYGEN WANT ON HEART ACTIVITY] Izuchenie vliâniâ ostrogo kislorodnogo golodaniâ na serdechnuû deâtel'nost'. — Klinicheskaâ meditsina (Moskva), 30 (10): 45-51. 1952. In Russian. DNLM

Nervous activity, respiration, and circulation of healthy subjects were tested in the decompression chamber under conditions of slowly increasing or briskly developing oxygen want. Simultaneously recorded electrocardiograms and encephalograms showed that, at the outset of hypoxia, an increased frequency in heart contractions coincided with higher nervous disturbances: sinus tachycardia and a decrease in R and T amplitudes on the electrocardiogram, considerable increase in the systolic index, and delta-waves on the encephalogram. Ten to 15 minutes after inhalation of air containing 9% of oxygen, a temporary adaptation to anoxia was observed: the delta-waves disappeared from the encephalogram, and the electrocardiogram tended towards normal. At an atmospheric oxygen content of 4-6% no adaptation to increasing hypoxia occurred. However, the electrocardiogram showed no further changes, while slow fluctuations appeared on the electroencephalogram, with gradually diminishing frequency and higher amplitudes, indicating deep nervous disturbances. Rapidly increasing severe hypoxia induces therefore much earlier and more pronounced functional disorders in the higher nervous system than in the cardiovascular; thus changes in heart activity cannot serve as an indicator of organic resistance to hypoxia.

982

Ambler, R. K. 1953
PRELIMINARY EVALUATION OF TWO FORMS OF THE SPATIAL APPERCEPTION TEST. — Naval School of Aviation Medicine, Pensacola, Fla. May 1, 1953. 5+8 p. (Project Report no. NM 001 057.04.04). AD 19 390 UNCLASSIFIED

Two Spatial Apperception Tests (SAT) were administered to 565 naval aviation cadets to test their ability to perceive spatial relationships when a minimum number of verbal factors was given. Half of the men received SAT I first, and the other half received SAT II first. The two forms had a correlation of 0.70. SAT II was significantly more difficult than SAT I. Some practice effect was indicated from previous experience on the Aerial Orientation Test or on the SAT. (AD abstract)

983

Ammons, R. B., 1952
L. Willig, and C. H. Ammons
DECREMENTAL FACTORS ASSOCIATED WITH DISTRIBUTION OF ROTARY PURSUIT PRACTICE [Abstract]. — Amer. Psychologist, 7 (7): 260-261. 1952. DLC (BF1.A55, v. 7)

The relationship was determined for rotary pursuit between amount of previous massed or distributed practice and amounts of temporary work decrement, warm-up decrement, and permanent work decrement. Young girls from the eleventh and twelfth grades practiced for 90 minutes, then were tested for 20 minutes. One half of the group practiced under each of two conditions: (a) cycles of 10 minutes work, 20 minutes rest (massed practice); (b) cycles of 1 minute work, 2 minutes rest (distributed practice). Half of each of these praccdition during the test period. Means by 20-second trials were calculated for each of the four groups, and the variance of the scores during the 20-minute test period was analyzed. It was found that: (a) large amounts of temporary work decrement developed during massed practice; (b) with increasing proficiency a slight decrease was observed in amount of temporary work decrement developed; (c) essentially no permanent work decrement appeared during practice, both as estimated during practice and as measured during the test period; (d) warm-up decrement decreased as a function of number of times practice had been resumed after a rest; (e) there was an interaction between practice and test condition, with subjects performing better when tested in the same condition as that in which they had practiced. (Abstract, modified)

984

Andreas, B. G., 1952
R. F. Green, and S. D. S. Spragg
FACILITATION EFFECTS BETWEEN FOLLOWING AND COMPENSATORY TRACKING TASKS. — Univ. of Rochester, N. Y. (Contract N6onr 241); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Report no. SDC 241-6-7, Aug. 1952. 8p. AD 126 262 UNCLASSIFIED

On a modified SAM (School of Aviation Medicine) Two-Hand Coordination Test subjects were required to follow an irregularly moving target with a follower that was controlled by two cranks. For compensatory tracking, a modified SAM Two-Hand Pursuit Test was used. Here the subjects turned two cranks to keep a moving target spot aligned with a set of cross-hairs. In each task, time on target was the measure of performance taken on each of the one-minute trials. Four groups of 23 subjects each participated in the experiment. For Groups I and II, the compensatory tracking device was set so that rotation of the cranks resulted in the "natural" or "expected" movement of the target. For Groups III and IV this relationship between controls and display was

"unnatural" for the compensatory tracking. Compensatory tracking performance with the "unnatural" control-display relationship was facilitated by prior practice on following tracking. No facilitation was observed: (a) on compensatory tracking performance with the "natural" control-display relationship after practice on following tracking; (b) following tracking performance after practice on compensatory tracking with the "natural" control-display relationship; (c) following tracking performance after practice on compensatory tracking with the "unnatural" control-display relationship. (From the author's summary)

985

Andreas, B. G. 1953
BIBLIOGRAPHY OF PERCEPTUAL-MOTOR PERFORMANCE UNDER VARIED DISPLAY-CONTROL RELATIONSHIPS. — University of Rochester, N. Y. Scientific Report no. 1, June 1953. iii+17 p. (Contract AF 30(602)-200). AD 19 328
UNCLASSIFIED

A bibliography containing 136 references is presented of reports and journal articles dealing with perceptual-motor performance under conditions of different display-control relationships. An introductory section lists articles on human engineering in general. The main part of the bibliography is subdivided as follows: (1) relationships between discrete display elements and discrete control movements; (2) relationships between the direction and plane of movement of the display and the direction and plane of movement of the controls; (3) the ratio between extent of movement of controls and resulting movement of display; and (4) control of velocity, rate-aided control and acceleration control.

986

Andreas, B. G., 1953a
R. F. Green, and S. D. S. Spragg
TRANSFER EFFECTS IN FOLLOWING TRACKING RESULTING FROM REVERSAL OF THE DISPLAY-CONTROL RELATIONSHIP ON ALTERNATE BLOCKS OF TRIALS. — Univ. of Rochester, N. Y. (Contract N6onr-241, Task Order 6); issued by Special Devices Center, Port Washington, N. Y. Technical Report no. SPECDEVCEN 241-6-10, Sept. 21, 1953. i+7 p. AD 51 494
PB 115399

It is the purpose of this study to determine the conditions which will minimize the losses in performance which occur when an operator switches back and forth between two pieces of equipment which differ in control-display movement relationships. The following results were obtained: (1) Performance with the "natural" display-control relationship is not adversely affected by interspersed trials with the "unnatural" condition. (2) Learning of tracking skill attained with the "unnatural" display-control relationship was less when practice under the "natural" condition was given first or interspersed. (3) The order in which the two opposite tracking tasks are performed has little effect on performance. (4) Upon changing from one task to the other, an initial facilitating effect may sometimes appear, but it does not persist. In design of equipment, the "natural" display-control relationship should be used wherever possible, because it is also more resistant to interference effects. For training purposes, this experiment indicates that there would be no reduction in interference effects by alternating tracking practice under the two conditions. (Special Devices Center summary, modified)

987

Andreas, B. G., 1953b
R. F. Green, and S. D. S. Spragg
TRANSFER EFFECTS IN PERCEPTUAL-MOTOR PERFORMANCE AS A FUNCTION OF AMOUNT OF PRACTICE [Abstract]. — Amer. Psychologist, 8 (8): 312. 1953. DLC (BF1. A55, v. 8)

Five groups of 30 subjects were given 1, 2, 4, 8, or 17 trials on a perceptual task, tracking on a modified two-hand coordination test. The relationships between the directions of rotation of the handwheels and movement of the target follower were then reversed and additional trials given. Performance on this reversed task was compared with that of a control group. For both tracking tasks a similar pattern of transfer effects was found on the first trial of the reversed task. After moderate amounts of practice on a standard task, a positive transfer effect was found, although it did not persist. After 1 trial or after 17 trials on the standard task, a negative transfer effect appeared. When a standard perceptual-motor task is changed by reversing stimulus-response relationships, the initial transfer effects appear to be a curvilinear function of the amount of prior training, negative for minimal prior training, becoming positive and then negative again as a function of practice on the initial task. The function may possibly be accounted for in terms of differential acquisition rates during practice of (a) general familiarity with the task and (b) specific habits of response based on the stimulus response relationships first encountered. (Authors' abstract, condensed)

988

*Ardashnikova, L. I. 1952
[ADAPTATION MECHANISMS TO OXYGEN WANT OF SHORT DURATION] O mekhanizmakh prisposobleniia k kratkovremennoĭ kislorodnoĭ nedostatochnosti. — In: Kislorodnaia terapiia i kislorodnaia nedostatochnost', p. 77-84. Kiev, 1952. In Russian.

Adaptation to oxygen want was studied in rabbits under exclusion of the chemoreceptors of the sinocarotid and aortic areas, and compared to reactions in intact controls. No increase in pulmonary ventilation was found in the experimental animals at 14-15% oxygen in the respired air, while in the controls it increased 20-30%, and doubled at an oxygen content of 9-10%. Training of these animals by exposing them to simulated elevations 30-

40 times daily did not induce compensatory pulmonary ventilation under anoxic conditions. The author concludes that the chemoreceptors of the sinocarotid and cardio-aortic areas are the only mechanisms securing rapid compensatory increase in pulmonary ventilation under diminished atmospheric oxygen. Metabolic stability during oxygen want (determined by oxygen consumption) was lower in the operated animals than in the controls. Training by daily "elevations" during 2 hours increased metabolic stability during oxygen want in the operated rabbits. Consequently, in the absence of the sinocarotid and aortic areas, other compensatory mechanisms develop. Compensatory blood formations were found more active in the operated animals than in the controls. The increased metabolic stability appeared to depend at least in part on augmented hemoglobin content. The author suggests that this stability is due to adaptation of the oxydizing processes in the tissues, which may be conditioned by cortical regulation of metabolism. [Abstract in: Sovetskoe meditsinskoe referativnoe Obozrenie, Fiziologiîa (Moskva), 1954 17: 35. DNLM (ZW1.qS729)]

989

Arden, G. B., 1953
and R. A. Weale
VARIATIONS IN THE LATENT PERIOD OF VISION. [Abstract]. — Jour. Physiol. (London), 122 (3): 12P. 1953. DLC (QP1.J75, v. 122)

When a swinging pendulum is viewed binocularly and a grey filter placed before one eye, the bob appears to describe an ellipse. This has been explained by assuming an increased latency of the nerve impulses reaching the brain from the darkened eye (Pulfrich effect [P. E.]). Two small light fields were presented, one to each eye. The time interval between the two and the intensity of one of them could be altered independently. This allowed measurement of the interval between the flashes when they appeared to be simultaneous. Two observers repeated the observations at various intensity ratios, both in the rod-free region of the fovea and in a location 8° to the nasal side of the fixation area. In the extrafoveal results there is a marked increase in latency as the intensity is reduced, particularly as the threshold is approached. In the foveal measurements, there is a small increase in latency with a decrease of intensity near the threshold. At higher luminance levels, a small but well-marked decrease in latency takes place as the intensity is reduced. Thus if the P. E. is due to latency variations it should be greatly reduced when observed only with cones. The P. E. is not altered when the pendulum is viewed through blue-green filters but is greatly reduced with deep-red filters. This was observed by seven observers. The red filters virtually prevent the stimulation of the rods. Therefore the P. E. is due to the great alteration in latency exhibited by the extrafoveal mechanism. (Abstract, modified)

990

Arends, R. L., 1952
C. J. Rayburn, W. B. Draper,
and R. W. Whitehead
EFFECT OF DIFFUSION RESPIRATION AND OF INHALATION OF HIGH CONCENTRATIONS OF CO_2 ON PLASMA VOLUME, THIOCYANATE SPACE, BLOOD CELLS AND O_2 CAPACITY. — Amer. Jour. Physiol., 171 (2): 507-512. 1952.
DLC (QP1.A5, v. 171)

The term "diffusion respiration" has been applied to a physiological process by means of which mammals in respiratory arrest are able, without the aid of artificial respiration, to secure sufficient O_2 from the ambient atmosphere to maintain life as long as an hour and a half. This phenomenon is seen only when the following conditions are fulfilled: (a) replacement of nearly all of the N_2 of the ambient atmosphere, respiratory passages, blood and tissues with O_2, (b) adequate circulation and (c) a patent airway. The disturbances in plasma volume, thiocyanate space, and cellular components of the blood during diffusion respiration and during inhalation of O_2 or of mixtures of 20 or 40 per cent CO_2 in O_2 have been investigated in the dog. It has been found that severe hypercapnia, whether brought about by diffusion respiration or by inhalation of CO_2 in O_2, results in a marked decrease in plasma volume, an irregular increase in extracellular fluid (thiocyanate space), and substantial increases in red cell count, red cell volume, and O_2 capacity of venous blood. There is no consistent change in either the white or differential count. (p. 1, and authors' summary, modified)

991

Armington, J. C. 1953
SELECTIVE ADAPTATION OF COMPONENTS OF THE HUMAN ELECTRORETINOGRAM [Abstract]. — Amer. Psychologist, 8 (8): 313. 1953. DLC (BF1.A55, v. 8)

The electrical response of the human eye consists of both a photopic (X wave) and a scotopic (B wave) component. When the eyes are partially light-adapted, the two components have a tendency to merge. Potentials were taken from the eye with an electrode mounted in a contact lens and were recorded with a Grass amplification system. Adaptation and test stimuli were produced with a dual optical system. While recording, either a red or a blue adaptation light was exposed continuously. During an experimental session, the subjects were first dark adapted and later light adapted. Then test flashes of various wave lengths were administered at 1-minute intervals. After measurement of the records, plots relating height of response and stimulus intensity were made for each color of test and adaptation stimulus. Finally, determinations of relative spectral sensitivity were made. The intensity plots exhibit greatest slope with test flashes of short wave length. Relative spectral-sensitivity data show that with red adaptation, long wavelength sensitivity is depressed while with blue adaptation, short wave-length stimuli become less effective. The results show quite clearly that X and B wave sensitivity may be selectively reduced through the use of suitable adaptation lights. (Author's abstract, condensed)

992

Armstrong, C. R. 1953
SPACE PHYSIOLOGY. — Jour. Brit. Interplanetary Soc., 12: 172-175. 1953.
DLC (TL790.A1B7, v. 12)

The sensory-motor system of a man living in a gravity-free state is subjected to abnormal handicaps. The muscle and skin pressure senses are gravireceptors and would be useless in a gravity-free state. However, the Vater-Pacini corpuscles being deep pressure receptors in the hands, feet, and joints, would probably continue to function and partially compensate for the loss of the other two receptors. The vestibular apparatus, which controls posture and is stimulated by gravity and by rotary movements, might also fail under zero, or near zero, gravity. Respiration and circulation are felt to present lesser problems. Under zero-gravity conditions, oxygen consumption would be low -- approximately 500 litres per day per person. By utilizing the upper physiological limit of increased oxygen pressure, which is 415 mm Hg, this problem can be minimized.

993

Arnould, P., 1952a
M. Lamarche, and M. Boulangé
[ACTION OF TWO SYNTHETIC ANTIHISTAMINICS, PHENERGAN (3277 R.P.) AND PHENYLBENZYLAMINO-2-METHYLIMIDAZOLINE (ANTISTINE) ON THE RESISTANCE OF THE GUINEA PIG TO ANOXEMIA] Action de deux antihistaminiques de synthese, 3277 R.P. (phenergan) et phenylbenzyl-amino-2-methyl-imidazoline (antistine) sur la résistance du cobaye a l'anoxémie. — Comptes rendus de la Société de biologie (Paris), 146 (5-6): 484-487. 1952. In French.
DLC (QP1.S7, v. 146)

As shown earlier (Arnould, P. and M. Lamarche, Comptes rendus de la Société de biologie (Paris), 144 (15-16): 1088-1091. 1950), subcutaneous administration to guinea pigs of neoantergan results in a decrease of resistance to anoxia. The study was continued with synthetic antihistaminics, using 2.5 or 5 mg./kg. of weight of phenergan and 5 mg./kg. of phenylbenzylamino-2-methylimidazoline (antistine). The animals were exposed to a simulated altitude of 12,000 m. at a rate of 7000 m. per minute, until appearance of apnea. — Tabulated results show that administration of phenergan or antistine induced a decrease in resistance to anoxia. The respiratory rhythm during anoxemia was markedly inferior in the treated animals than in the control. It is believed that the decrease in polypnea observed in the treated animals is an important factor with regard to the decrease in resistance. No toxic effects were observed after the above doses of synthetic antihistaminics had been administered.

994

Arnould, P., 1952b
and M. Lamarche
[CHANGES IN BLOOD VOLUME AND INTERSTITIAL FLUID DURING SEVERE ANOXEMIA] Variations de la masse sanguine et des liquides interstitiels au cours de l'anoxémie aiguë. — Comptes rendus de la Société de biologie (Paris), 146 (19-20): 1616-1618. 1952. In French.
DLC (QP1.S7, v. 146)

Hematocrit and plasma volumes were determined in chloralized dogs before and after exposure to anoxia (inhalation of mixtures of 90% N_2 and 10% O_2). Measurements were made after injection of sodium thiocyanate and Chicago blue. Two series of tests, with a 48-hour interval in between tests, produced very similar results with regard to blood and interstitial fluid volumes. Anoxemia was induced in 10 animals of various sexes and weights, one-half hour before the second series of tests. Tabulated results showed the following decreases: plasma volume 24%, hematocrit 4.5%, and blood volume 14%. The interstitial fluid volume increased an average of 9.1%, while the over-all extracellular fluid volume remained unchanged. It is deduced that, in severe anoxia, a displacement of the plasmatic fluid toward the interstitial fluids takes place, without any changes in the total extracellular fluid volume. The hematocrit remains practically unchanged.

995

Arnoult, M. D. 1952
LOCALIZATION OF SOUND DURING ROTATION OF THE VISUAL ENVIRONMENT. —Amer. Jour. Psychol., 65 (1): 48-58. 1952.
DLC (BF1.A5, v. 65)

The interaction of the visual and auditory systems in the localization of a sound was tested on ten subjects. The apparatus consisted of a large cylinder revolving around test subjects sitting within. The subjects were required to report the location of a sound source in the horizontal plane while being under the impression of (1) rotating to the right, (2) rotating to the left, and (3) being stationary. The sound stimulus was a 120 c.p.s. buzz made by headphones placed in the horizontal plane at 10° intervals from 40° left to 40° right. Mean localizations were computed, and latencies, post-rotational effects, and eye movements were measured. The following results were obtained: (1) There is a tendency for the subjects, as a group, to displace the sound in the direction of the experienced rotation. (2) In general the magnitude of the displacement was small. (3) The subject's displacements as a group were statistically significant in direction but not in size. (4) The latent period of rotation, i.e., the interval between the beginning of the revolving of the cylinder and the first report of the experienced rotations varied from 5 to 58 seconds. And (5) the average frequency of eye movements during rotation varied from 2.0 to 3.4%. (Author's summary and conclusions, modified)

996

Aschan, G., 1952a
C. O. Nylen, J. Stahle, and R. Wersäll

THE ROTATION TEST. — Acta oto-laryngologica (Stockholm), 42 (6): 452-459. 1952. In English. DNLM

Healthy adults (320) of both sexes were examined for postrotatory nystagmus and "after-sensations". The acceleration was kept at $0.5°/sec.^2$, the speed did not exceed 50°/sec., and the deceleration was $20-30°/sec.^2$. The results were as follows: (1) Statistical analysis confirmed earlier findings that, under given conditions, postrotatory phenomena are correlated to speed, which is illustrated graphically by cupulograms. (2) There is considerable individual variation, seen in the displacement up or down, of the cupulogram and in the range of nystagmus- and sensation-inducing speed thresholds and their means. (3) Paired observations for left and right stimuli highly facilitate the detection of cupulographic "nystagmus susceptibility", i.e., directional preponderance. (4) When rotation to the right precedes rotation to the left at any speed, the nystagmus cupulogram will display a system of directional preponderance to the left. Conversely, when the initial rotation is to the left, the resulting preponderance will be in the opposite direction. This is not applicable to sensation. (5) A single pair of observations of nystagmus durations, following contradirectional stimulation, which differ by more than 12-13 seconds might indicate abnormality. A consistent unidirectional difference over 6 seconds at 4-6 speeds is pathological. (6) Clinical usefulness is foreseen for the nystagmus cupulogram, especially in detecting directional preponderance. And (7) the tests produced no symptoms of nausea in any of the subjects. (Authors' abstract, modified)

997

Aschan, G. 1953
[PROGNOSIS IN SO-CALLED ACOUSTIC TRAUMA IN FLYING PERSONNEL OF THE SWEDISH AIR FORCE] Prognosen vid s. k. bullerskada hos flygande personal inom svenska flygvapnet. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (1): 15-18. 1953. In Swedish. DNLM (W1.SW387, v. 2)

Thirty-four members of the flying personnel were tested for auditory acuity in 1952, 10 years after an initial auditory examination done in 1942. In this group, which consisted of men continually exposed to flight trauma, little loss of auditory acuity was observed after the 10-year period. The losses which did occur and the traumas which developed seemed to be located more often in the left ear than in the right one.

998

Assis, C. M. de 1953
[JURISDICTION, PURPOSE, AND ORGANIZATION OF THE MEDICAL SERVICE OF A BASE OF TACTICAL UNITS IN TIMES OF WAR] Atribuições, finalidades e organização do Servico Médico, de uma base de Unidades Táticas em tempo de guera. — Revista médica da aeronáutica (Rio de Janeiro), 5 (1): 63-78. 1953. In Portuguese. DNLM (W1.RE609, v. 5)

In order to be ready for any unusual situation or surprise attack, the establishment of flexible tactical units within the Brasilian Air Force is suggested by the author. The units, attached to the various air bases would be medically supervised by an air-surgeon. The maintenance personnel of the base, the wounded, the evacuees, and the victims of radiation would be under the medical care of an army physician. In addition, the presence of a biologist (expert in radiation damage), a surgeon and other medical specialists, and a neuropsychiatrist should be all available at the base when needed. First-aid stations, ambulances, sanitary personnel, installations of underground telephone and radio communication, a good stock of the most important drugs should be all remembered when setting up the unit. The possibility of repeated attacks against air bases necessitates the establishment of proper evacuation facilities both for the healthy and the wounded. In case of sudden atomic attack or chemical warfare, the reserve of drugs and the efficiency of the evacuation system will be the decisive factors.

999

Astaldi, T., 1952
E. Bernardelli, and G. Rebaudo
RESEARCH ON THE PROLIFERATION ACTIVITY OF ERYTHROBLASTS AT LOW ATMOSPHERIC PRESSURE. — Experientia (Basel), 8 (3): 117-119. 1952. In English. DNLM

The sternal bone marrow of 10 subjects exposed to atmospheric pressures from 760 to 160 mm. Hg was explanted. Results showed that the proliferation activity of erythroblasts diminishes in linear proportion with the decrease of atmospheric pressure. At low atmospheric pressures, the reduction of proliferation is greater in the polychrome erythroblasts than in the basophils. It is concluded that, contrary to current views, hypoxia inhibits erythropoiesis. Thus, the polyglobulism observed under conditions of low barometric pressure is not a consequence of decreased oxygen tension at the bone marrow level, but rather a reaction to the effect of hypoxia on the organism as a whole; this reaction is the stimulus-eliciting erythropoiesis.

1000

Astrand, P. O. 1953
[NOMOGRAM FOR CALCULATION OF MAXIMAL OXYGEN UPTAKE CAPACITY] Nomogram för beräkning av maximal syreupptagningsförmaga. — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (4): 16-17. 1953. In Swedish. DNLM (W1.SW387, v. 2)

Eighty-five students were used in these tests, which determined oxygen uptake capacity with the aid of an ergometer and spirometer. As a mean average, the female students had a maximal oxy-

gen uptake of 2.90 liters per minute and the male students of 4.11 liters per minute. A nomogram was made to calculate the mean averages of maximum oxygen uptake per minute.

1001

Atkinson, C. J. 1952b
SOME INFLUENCES OF DELAYED SIDE-TONE UPON INTELLIGIBILITY. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064. 01.13). Joint Project Report no. 13, July 15, 1952. 6+3 p. TIP U24415 PB 107685

Groups of listeners heard intelligibility tests in noise and in quiet. The speakers read with delays of 0.02 to 0.09 second introduced into their side-tone ("echo"). The listener heard either the original saying or the original plus the delayed saying of speech material. The delay of 0.05 second in the side-tone of the speaker appeared to affect the reception of his speech benificially; the intelligibility scores for this condition were significantly higher than at other delay times. An intelligibility increment similar to but less than that observed for the 0.05 second delay was present for the 0.08 and 0.09 second delay of side-tone. The effects of the delayed side-tone upon the intelligibility of a speaker became evident in a period of less than two minutes. (From the author's summary and conclusions)

1002

Atkinson, C. J. 1953
RATE AND SOUND PRESSURE LEVEL OF SPEAKING AS AFFECTED BY SPECTRUM CHANGES IN AMPLIFIED SIDETONE. — State Univ. of Iowa, Iowa City. Supplementary Report no. 1, July 1, 1953. 14 p. (Contract DA 36-039 sc-42562). AD 19 639 UNCLASSIFIED

Two experiments, with 50 subjects in each, were performed in an attempt to assess the effect of the spectrum of sidetone on some of the aspects of speech. One experiment was concerned with rate of speech, and one experiment was concerned with both rate and sound pressure level of speech. Sidetone, either filtered by high-pass or low-pass filters with a cutoff at 1900 cycles per second, or not filtered, was returned to the ear of the talker. No effort was made to equate the changed sidetone level resulting from the filtering. The rate of speech was found to be affected slightly from one condition to another in one experiment and not in a demonstrable way in the other experiment. The sound pressure level was found to be changed by the sidetone conditions. The sound pressure level was lowest for the normal sidetone condition, higher for high-pass sidetone condition, and highest for low-pass conditions. (From the author's summary)

1003

Atkinson, P. I. 1952
MASKED AUDITORY THRESHOLD FOR A PURE TONE PRESENTED RANDOMLY AT FOUR FREQUENCIES [Abstract] — Amer. Psychologist, 7 (9): 524. 1952. DLC (BF1.A55, v. 7)

The aural threshold for a pure tone masked by thermal noise was compared for two conditions: (a) test tone presented at fixed frequency, (b) test tone randomly presented at each one of four predetermined frequencies. No evidence was found to indicate any significant difference between the thresholds for the two conditions. (Entire abstract

1004

Aubertin, M. E. 1953
[PREVENTION AND TREATMENT OF NAUSEA AND VOMITING, ESPECIALLY IN MOTION SICKNESS] Prevention et traitement des nausées et vomissements, notamment dans le mal des transports. — Journal de médecine de Bordeaux et du sud-ouest (Bordeaux), 130 (4): 573-574. 1953. In French. DNLM

Instead of Dramamine, a homologous bromotheophyllinate, the Bromanautine (Roussel Laboratories),can be used, as a preventive as well as a therapeutic agent for motion sickness, with similar results.

1005

Aulhorn, E. 1953
[ON FIXATION WIDTH AND FIXATION FREQUENCY IN READING DIRECTIONALLY ARRANGED CONTOURS] Über Fixationsbreite und Fixationsfrequenz beim Lesen gerichteter Konturen. — Pflügers Archiv für die gesamte Physiologie (Berlin), 257 (4): 318-328. 1953. In German. DLC (QP1.A63, v. 257)

Reading speed is determined by both width and frequency of fixations. Measurements of these two factors in their relation to letter position and direction of lines are described in this paper. Six test subjects were required to read nonsense syllables from a reading text which was so designed as to allow for rotation of individual letters and for slanting of lines in various directions. Time was recorded with a stop watch, and fixations were determined by observing the reflections of a light beam from the sclera with the aid of a telescope. The following observations were made: (1) correlations were established between reading speed, width and (to a lesser degree) frequency of fixations on the one hand, and position and density of letters on the other; (2) reading practice affected reading speed by increasing fixation width rather than fixation frequency; (3) "fields of reading vision" which correspond to certain retinal areas, could be established by determining fixation widths in various directions; (4) the shapes of these fields of reading vision depend on the position (slant) of the letters in the test; and (5) it follows that the same locus on the retina possesses different perceptual powers depending on the nature of the observed contours; hence, perception cannot be considered solely a retinal function.

1006

Aulhorn, E., and W. Voges 1953a
[BORDERS OF THE PARAFOVEAL VISUAL

FIELD DEPENDING ON THE POSITION OF OBSERVED CONTOURS] Parafoveale Gesichtsfeldgrenzen in Abhängigkeit von der Lage der dargebotenen Konturen. — Pflügers Archiv für die gesamte Physiologie (Berlin), 257 (4): 329-342. 1953. In German.
DLC (QP1. A63, v. 257)

Perimetric measurements were carried out on the parafoveal region of the retina (1°-7°). Parallel black and white stripes which could be rotated at 45° turns, were used for stimulation. Exposure time varied between 0.05 and 0.37 second. The following results were obtained: (1) The shape of the visual field depends on the position of the stripes (horizontal stripes give a transversely oval visual field with constrictions in two vertical meridians; vertical stripes give round visual fields with minor constrictions in the vertical meridians; and slanted stripes give oval visual fields whose main axis is parallel to the position of the stripes). (2) Increase of exposure time leads to an enlargement of the visual field without changing its shape. (3) Change of the apparent size of the stripes likewise causes enlargement of the visual field, the transversal diameter increasing more, relative to the vertical diameter. Similarities were observed between the outer borders of the visual fields observed in this experiment and the "fields of reading vision" described in the paper, Aulhorn, E., 1953, when the positions of letters and stripes were equal. It is presumed that similar physiological mechanisms govern both perceptive processes. (Authors' summary, modified)

1007

Austin, J. D. 1952
COMPARISON OF AIRCREW STANINES AND AVIATION-CADET OFFICER-CANDIDATE QUALIFYING TEST SCORES. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-5, Feb. 1952. 14 p (Project no. 503-002-0003). AD 74 829 UNCLASSIFIED

The purpose of this research note is to make available the distribution statistics for samples of several populations tested with the Aviation-Cadet Officer-Candidate Qualifying Test; to present conversion tables between the various scores on this test and the Aircrew Classification Battery stanines; and to present pass-fail expectancy tables for the AC-OC test. It is concluded that the AC-OC QT-AXA and AXB composite scores of Pilot, Navigator, and Officer Quality are significantly related to the corresponding Aircrew Classification Battery stanines. Practical application of this relationship may be effected by data herein included which make possible the conversion of scores between these composite scores and the stanines as well as the prediction of the potentialities of various AC-OC cut-off points on the Pilot composite score distribution. (From p. 1 and 4)

1008

Avzugarova, G. A. 1952
[LATE EFFECTS OF BLAST INJURIES OF THE EAR AND THEIR EFFECT ON WORKING CAPACITY] Otdalennye posledstviia vozdushnoĭ kontusii ukha i ikh vliianie na trudosposobnost'. — Vestnik oto-rino-laringologii (Moskva), 14 (1): 34-37. 1952. In Russian. DNLM

Effects of air blast on the sound analysor, on the vestibular apparatus, and on the nervous system were studied in 500 combat-injured patients, 2 to 7 years after the incident. Results showed a direct relationship between the intensity of the blast and damages to the ear. Purulent post-contusion otitis was found in 9% of the cases, mostly mesotitis with favorable outcome. Permanent hearing disorders were observed in the majority (55.8%) of patients, attributable chiefly to damage of both the sound-conductor and the sound-receptor apparatus. An increased instability of auditory thresholds (under conditions of noise exposure or nervousness) and of autonomous vestibular reactions was noticed. "Musical hearing" was either completely lost or greatly impaired in 90% of professional musicians after exposure to severe blasts, and in 74% of amateurs. Speech disorders were encountered in 46.4% of the cases; however, in only 16% the defects (stuttering) were of a permanent nature. An increase in excitability of the vestibular autonomous nervous system was noted in 52.8% of the cases. Although the extent of hearing damage and of vestibular disturbances was relatively small in the cases cited, the after-effects of air-blast injuries of the ear have a marked influence on a person's working capacity, because of the instability of hearing thresholds and because of the impairment of vestibular functions.

1009

Awad, M. Z., 1952
and R. J. S. McDowall
THE EFFECTS OF ANOXIA AND SODIUM CHLORIDE ON THE ISOLATED RAT DIAPHRAGM. [Abstract] — Jour. Physiol. (London), 116 (4): 30P. 1952. DLC (QP1.J75, v. 116)

When a rat diaphragm preparation, in oxygenated Krebs solution, is deprived of oxygen, there is first an augmentation of the response to a maximal indirect stimulus, followed by a depression which proceeds to complete neuromuscular block. Readmission of oxygen leads to a recovery, but even if the anoxia has lasted only 3-5 min., the recovery is temporary and is followed unexpectedly by complete block. The addition of sodium chloride to the bath prevents the temporary recovery and accelerates the final failure, while reduction of sodium chloride delays or prevents it. The results appear to indicate that acute anoxia damages a conducting mechanism in which sodium chloride is concerned. (Abstract in full)

1010

Babskiĭ, E. B., 1952
V. S. Gurfinkel, and E. L. Romel'
[A NEW METHOD FOR AND SOME RESULTS OF THE INVESTIGATION OF THE VESTIBULO-

MOTOR REFLEX IN MAN UPON INADEQUATE STIMULATION OF THE VESTIBULAR APPARATUS] Novaîa metodika i nekotorye resul'taty issledovaniîa vestibulomotornogo refleksa cheloveka pri neadekvatnom razdrazhenii vestibulîarnogo apparata. — Vestnik oto-rino-laringologii (Moskva), 14 (5): 19-22. 1952. In Russian. DNLM

A new method of recording oscillations of the human body by means of a special device, the "stabilograph", is described and the physiological mechanism discussed. Displacements of a support on which the subject stands, induced by body oscillations, are registered by an oscillograph. Stimulation of the vestibular apparatus was performed on healthy, young adults by a direct electrical current of 1 to 2.5 milliampere, at 5- to 20-minute intervals. A commutator permitted stimulation of the vestibular apparatus alternatingly in both ears. The latency periods of vestibular stimulation, the direction, and amplitude of deviation of the center of gravity of the subject's body, duration of each body oscillation, and the general duration of the reflex action were determined. Analysis of the oscillograms showed 3 types of body oscillations: (1) oscillations normally encountered in the standing position, without vestibular stimulation; (2) oscillations produced by vestibular stimulation (reflex head deflection); and (3) oscillations induced by rapid body movements. Analysis of the data shows that, under vestibular stimulation, the displacement of the center of gravity to either side is 4 to 15 mm.; the duration of a single oscillation is 0.5 to 1.7 second; and the duration of the entire vestibulo-motor reflex is 1 to 8 seconds.

1011

Baggaley, A. R., 1953
and R. B. Cattell
INVENTION AND VALIDATION OF OBJECTIVE MOTIVATION MEASURES [Abstract]. — Amer. Psychologist, 8 (8): 315. 1953.
DLC (BF1.A55, v. 8)

Two batteries of some twelve objective test devices each were administered to groups of about 50 Air Force candidates. The devices simultaneously tested four different attitudes toward: (a) flying, (b) a career in the Air Force, (c) drinking and smoking, and (d) movie attendance. The tests were constructed on the attitude definition which formulates the activity involved in the attitude in relation to an object. The most reliable tests, according to the corrected split-half method, were Sentences Coming into Focus, Preference, Visual Distraction, and Misbelief-Autism. Significant interindividual differences in level of performance on the Sentences Coming into Focus, Visual Distraction, and Spelling of Technical Terms tests indicated the desirability of ipsative scoring. Internal validity was estimated by averaging phi coefficient intercorrelations (by means of Fisher's z transformation). Varying degrees of validity were shown, with the Preference, Misbelief-Autism, Choice to Explain, and Book Preference tests heading the list. The factor structure of the intercorrelations was also examined in relation to hypotheses. (Authors' abstract, condensed)

1012

Bahn, R. C., 1953
and D. Glick
THE QUANTITATIVE HISTOLOGIC DISTRIBUTION OF ASCORBIC ACID IN THE ADRENAL GLAND OF THE RAT AND MONKEY. — Univ. of Minnesota. Lab. of Physiological Hygiene, Minneapolis (Contract AF 18(600)169); issued by School of Aviation Medicine, Randolph Field, Tex. Unnumbered Report, Dec. 1953. iii + 7 p. AD 30 250
PB 114249

The quantitative histological distribution of ascorbic acid in the adrenal gland was analyzed in normal Macaca rhesus and M. cynomolgus monkeys to obtain a basis for future studies on the effects of stress. Although the concentration of ascorbic acid is 4 to 5 times greater in the gland of the rat than it is in that of the monkey, the same qualitative distribution of ascorbic acid was found in both. The highest concentrations of ascorbic acid were demonstrated in the outer fascicular and in the reticular zones. Only very small concentrations of dehydroascorbic and diketogulonic acids were found in any of the histologic regions in the adrenal of the rat. The histological microchemical methods employed are discussed in detail. (Authors' summary, modified)

1013

Bahnson, H. T. 1952
EFFECT OF A BRIEF PERIOD OF VOLUNTARILY INCREASED PULMONARY PRESSURE UPON VITAL CAPACITY. — Jour. Applied Physiol., 5 (6): 273-276. 1952. DLC (QP1.J72, v. 5)

Following a voluntary increase in pulmonary pressure to 40 mm. Hg maintained for 5 seconds in the maximal inspiratory position, an additional volume of air can be inhaled. This increment can be expressed as a change in vital capacity and averages 147 cc. or 2.71% with one significant difference of 1.15% of the normal control vital capacity while erect. When recumbent this value is 306 cc. or 5.62 ± 2.64% of the erect control. An average reduction of 261 cc. or 4.80 ± 2.38% of the vital capacity occurs on assuming the recumbent position from the erect. The significance of these findings is discussed in connection with the volume of blood in the lungs in the erect and recumbent positions. (Author's summary)

1014

Bahrick, H. P., 1952a
P. M. Pitts, and R. E. Rankin
EFFECT OF INCENTIVES UPON REACTIONS TO PERIPHERAL STIMULI. — Jour. Exper. Psychol., 44 (6): 400-406. 1952.
DLC (BF1.J6, v. 44)

Essentially the same as the report, Bahrick, H. P., 1952.

1015

Bahrick, H. P. 1953
PERCEPTUAL AND MOTOR SKILL RESEARCH IN GERMAN LABORATORIES, 1940-1952. — Ohio State Univ., Columbus (Contract AF 33(038)-10528); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-20, July 1953. iii+14 p. (Project no. 509-020-0004). AD 19 501 PB 124635

The theoretical and experimental research and the physical setup of 15 laboratories in Western Germany, Austria, and Switzerland are discussed. The research areas receiving the most attention include depth psychology, characterology, research in selection of industrial trainees, and experimental studies of perception and motor coordination. Annotated references of 24 German articles are presented which relate to the movement theory, coordination and rhythm, practice effects and work decrement, and apparatus development. (AD abstract)

1016

Bair, F. H., 1953
and L. J. Petti
DETERMINATION OF THE MOST DESIRABLE RIDGE PATTERN FOR PILOTS' PROTECTIVE HELMETS. — Naval Air Experimental Station. Aeronautical Materials Lab., Philadelphia, Pa. Report no. AML NAM AE 4407, Part 1, Dec. 9, 1953. 17+2 p., 21 tables, 27 plates. AD 30 501 UNCLASSIFIED

Helmet shells having 6 designs were prepared and tested under static and dynamic (impact) loads. The plain shell appeared to be the most resistant to impact loading, but was the least resistant to static loading; sandwich or semi-sandwich construction may improve the properties. Rounded ridges are preferred over sharp ridges. Intersecting ridges tend to deleteriously localize the stresses. The pendulum-impact-high-speed-camera procedure, developed during this investigation is a satisfactory method of conducting impact tests. (Authors' abstract)

1017

Bair, J. T., 1952c
and [C.] Maag
ADJUSTMENT FACTORS RELATED TO MOTIVATION OF NAVCADS. — Naval School of Aviation Medicine, Pensacola, Fla. Memorandum Report (Attrition Report no. 3), Jan 24, 1952. 6p. TIP U69673 UNCLASSIFIED

Motivational factors were studied influencing attrition of cadets from the Naval Air Training Command. The analysis is based on data obtained both from confidential interviews and questionnaires. Twenty cadets who were discharged from service on their own request and 6 cadets who were flight failures were included in the study sample. The most frequent reasons for "dropping out" were: (1) fear of failure, (2) general tenseness, (3) lack of accomplishment, (4) depression, (5) family hardships, (6) desire to get married, (7) lack of motivation in view of the improved international situation, (8) feeling of being misplaced, and (9) dissatisfaction with the instructor. Both the attrition and the flight-failure groups were similar with regard to age, education, previous military service, and number of flights. The interviews with these cadets revealed a great concern about their decision to withdraw from flight service and uncertainty about their future careers. Many of them expressed a desire for help. More careful screening of the cadets, particularly in the area of attitudes and personality factors, is recommended.

1018

Bair, J. T. 1952d
CHANGES IN TRAINING TIME AND MOTIVATIONAL FACTORS FOR CADETS VOLUNTARILY RESIGNING FROM THE NAVAL AIR TRAINING PROGRAM. — Naval School of Aviation Medicine, Pensacola, Fla. Special Report (Attrition Report no. 5), Aug. 25, 1952. 4+2p. AD 144 101 UNCLASSIFIED

This report evaluates the differences in length of training time and in motivational factors for two groups of cadets who voluntarily left the Naval Air Training Program. The first group withdrew during a seven-month period in 1951, and the second group resigned during a seven month period in 1952. The majority of the cadets from the former group were able to return directly to civilian life, whereas the cadets in the latter group were required to serve out their time in an enlisted status upon resignation from the Naval Air Training Program. An analysis of the data obtained from interviews and questionnaire forms indicates that the group who voluntarily resigned during 1952 remained in the program about one month longer than did the group withdrawing during 1951. Furthermore, the 1952 group contained significantly more cadets who withdrew during "F" stage of training. An overall comparison of attitudes reported by both groups revealed more anxiety feelings concerning flying for the 1952 group than for the 1951 group. These data suggest that obligated enlisted service for those men who leave the program at their own request seems to result in prolonging their decision to leave and thus in aggravating their anxieties toward flying rather than in significantly reducing the DOR (Discharged On Request) attrition rate. (Author's summary)

1019

Bair, J. T., 1952e
and E. P. Hollander
THE SIGNIFICANCE OF ATTITUDES TOWARD AUTHORITY-FIGURES IN DISCRIMINATING BETWEEN NAVAL AVIATION CADETS OF "HIGH" AND "LOW" MOTIVATION. — Amer. Psychologist, 7 (7): 397. 1952. DLC (BF1.A55, v.7)

A condensation of the report, Hollander, E. P., 1952.

1020

Bair, J. T., and R. K. Ambler 1953

EXPRESSED REASONS AND BACKGROUND CHARACTERISTICS FOR NAVAL AVIATION CADETS WITHDRAWING VOLUNTARILY DURING JANUARY 1953. — Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 53-2 (Attrition Report no. 6), Feb. 16, 1953. 4+iv p., 4 tables. AD 131 596 UNCLASSIFIED

This report summarizes data obtained in interviews with sixty-three cadets who "attrited" voluntarily during January 1953. The results of these interviews revealed that the majority of the cadets left the program because of an active dislike of flying. Furthermore, acute concern was expressed by one-third of all cases. These results corroborate previous findings and emphasize the need for earlier flying experience so that many of these men would "attrite" earlier or would never enter training. A systematic analysis was made of other factors related to voluntary withdrawal, and an appendix is included in which cadets are quoted directly with regard to their individual reasons for leaving the program. (Authors' summary)

1021

Bair, J. T., E. P. Hollander, and R. K. Ambler 1953a

THE DEVELOPMENT OF AN INVENTORY OF SOCIAL ATTITUDES RELATED TO MORALE OF NAVAL AVIATION CADETS. — Naval School of Aviation Medicine, Pensacola, Fla. April 13, 1953. 8+8 p. (Project Report no. NM 001 058.21.01). AD 17 023 UNCLASSIFIED

A self-rating attitude inventory was constructed for possible use in the selection of Naval Aviation Cadets and obtaining an index of their morale level in training. Analysis of the preliminary 120-item test revealed 39 significant statements which differentiated between cadets who had later completed basic flight training and those who withdrew or failed. These items were included in a revised form of the morale inventory which is being investigated. (AD abstract)

1022

Bair, J. T., and C. H. Maag 1953b

ATTITUDES TOWARD ENTERING TRAINING AS PREDICTORS OF MOTIVATION AMONG STUDENT AVIATORS. — Naval School of Aviation Medicine, Pensacola, Fla. July 7, 1953. 6+vi p. (Project Report no. NM 001 058.05.06). AD 17 534 UNCLASSIFIED

A total of 700 cadets completed a questionnaire form on which they checked their reasons for entering the Naval Aviation Training Program. Two validation analyses revealed the following information: (1) cadets who indicate a long standing desire to be an aviator have greater chances of completing the program than do others; (2) cadets who enter training with a primary interest in being an officer are more likely to withdraw voluntarily than those who are mainly interested in flying itself; (3) cadets in this study were consistent and truthful in stating their reasons for entering the program. These results substantiate previous conclusions that the best training risks for Naval Aviation were those young men who feel that flying fulfills important goals for them. On the other hand, the poor risks are candidates who have only a superficial interest in aviation and are attracted by the glamour of being a Naval Officer. (Authors' summary, modified)

1023

Bair, J. T., and E. P. Hollander 1953c

STUDIES IN MOTIVATION OF STUDENT AVIATORS AT THE NAVAL SCHOOL OF AVIATION MEDICINE. — Jour. Aviation Med., 24 (6): 514-517, 522. 1953. DLC (TL555.A1A4, v. 24)

A content analysis of interview records collected over a 3-year period revealed the following most frequently reported reasons for students' leaving training: (1) dislike of flying, (2) dissatisfaction with naval reserve policy, (3) outside social pressures, (4) dislike of military life, (5) personality maladjustment. Cadets who completed training also mentioned some of the above factors as dislikes. Students who withdrew from naval air training had less personal and social contacts with their instructors and fellow students than those students who completed training. Recommendations for enhancement of cadet motivation are: (1) more flight experience before cadets report to Pre-Flight, (2) greater recognition of cadet status and achievement, (3) more realistic recruiting programs, (4) and the establishment of group counseling for the cadets to air their grievances, anxieties, and doubts.

1024

Bakan, P. 1952

PRELIMINARY TESTS OF VIGILANCE FOR VERBAL MATERIALS. — Univ. of Illinois (Contract AF 33(038)-25726); issued by Human Resources Research Center. [Technical Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. TECH 52-7, July 1952. 7 p. (Project no. 507-011-0001). ATI 162 943 UNCLASSIFIED

It was the aim of this study to collect data on the performance of subjects required to respond aperiodically to certain designated sequences of digits within a continuous series recorded on tape. Specifically, the task was to listen to the tape and to write on a separate card odd-number sequences interspersed in the over-all sequence. Omission errors and commission errors (recording of nonexistent odd-number sequences) were scored. The results for 15-minute periods reveal a progressive decrement in the ability to detect the odd-number sequences. The results, scored over a number of days, indicate a progressive improvement in performance from the first to the fourth day. This is attributed to a "learning" effect.

1025

Bakan, P., 1953
W. E. Kappauf, and M. C. Payne
REVIEW OF PSYCHOLOGICAL RESEARCH BEARING ON RADAR-SCOPE INTERPRETATION IN ADC OPERATIONS. — Univ. of Illinois, Urbana (Contract AF 33(038)-25726); Issued by Human Resources Research Center. Aircraft Observer Training Research Lab., Mather Air Force Base, Calif. Technical Report no. 53-26, Aug. 1953. iii+15 p. (Project no. 506-051-0001).
AD 19 002 UNCLASSIFIED

The review concerns the application of pertinent aspects of the literature to the use of long-persistent radarscopes in Air Defense Command operations. Recommendations to increase pip detection include: the determination of the optimum brightness for operating radarscopes, the eye adaptation of scope operator to a brightness level slightly below that of the scope face, use of an expanded range sweep, avoidance of overlay or filter, use of range and bearing scales, a 15-inch minimum distance between scope and operator, and a 30-minute maximum scope-watching period. (AD abstract)

1026

Bakan, P., 1953a
and W. E. Kappauf
SYSTEMATIC ERRORS IN DIAL READING AS A FUNCTION OF DIAL DESIGN AND OF INSTRUCTIONS ABOUT ERRORS [Abstract]. — Amer. Psychologist, 8 (8): 315-316. 1953.
DLC (BF1. A55, v. 8)

Dials of two designs were compared, a "standard" dial and a "modified" dial. All dials were scaled from 0 to 40, marked by units and numbered every 10 units. The modified dial had a "built-in" error factor: the 5-marks were coded and the upper and lower halves of the 10-units intervals were differentially marked. The subjects were divided into four groups corresponding to the following test conditions: (a) standard dial, (b) modified dial, (c) standard dial with special instructions, (d) modified dial with special instructions. The dials were read in test books. All subjects were tested at the same time on each of five successive days. The first day was a practice session. Each subject read 2,688 dials over the four-day test period. The groups reading the modified dial made 40% fewer + 10 units errors and 50% fewer + 5 units errors. The special instructions had no significant effect on the frequency of any of the errors under study. The failure of the special instructions to reduce error frequency is thought to have been a function of the way in which the special instructions were presented. (Authors' abstract, condensed)

1027

Baker, C. A. 1953
INTERPOLATION ACCURACY AS A FUNCTION OF VISUAL ANGLE BETWEEN SCALE MARKS [Abstract]. — Amer. Psychologist, 8 (8): 316. 1953. DLC (BF1. A55, v. 8)

Interpolation accuracy as a function of visual angle was determined on fifteen subjects. The stimulus material consisted of white 9 x 9-in. cards. Each card had a circle 4 inches in radius. Various cards had 0, 1, 3, 7, or 15 equally spaced concentric circles within the 4-inch circle. Thus the concentric circles were separated by 1/4, 1/2, 1, 2, and 4 inches. A dot appeared in the center of each card. Five "targets" were placed on each of the 25 stimulus cards. Viewing distances were 10, 15, 20, 30, and 40 inches. The subjects' task, as instructed, was to read the ranges of the targets to the nearest 10 yards. Successive rings represented distances of 1,000 yards. After a practice session subjects called out range values for five targets on each of 25 cards. Viewing distance, ring separation, and card series were counterbalanced in a grecolatin-square design. There were two replications. The visual angles subtended by the distance between range rings ranged from 22° 38' to 0° 22'. For all visual angles used the accuracy, expressed in percentage of the interval in error, was constant. This contradicts previous assertions. The slope value of 0.0358 is found when average error in visual angle is plotted against ring-separation visual angle. (Author's abstract, condensed)

1028

Baker, G. W. 1953
ATTITUDES AND JUDGMENTS OF SOME LIEUTENANTS RELATED TO PRESENT ACTIVE DUTY INTENTIONS. — Human Resources Research Inst., Maxwell Air Force Base, Ala. Report on Motivation and Integration of New Officers. Technical Research Report no. 14, May 1953. xi+66p. (Project no. 505-036-0011). AD 19 564
PB 117990

Questionnaires were administered and interviews conducted in an effort to explain why a large majority of the 1951 Air Force Reserve Officers Training Corps (AFROTC) graduates intended to terminate their active duty at the end of the required tour. Analysis of the results showed the following: (1) of 366 lieutenants questioned, 36 wanted to extend their tour of duty, 247 wanted to leave the Air Force, and 74 were undecided; (2) the majority of the officers had no previous intention to stay in the Air Force; (3) there was widespread criticism of the administration of command; (4) wives and girl friends exerted greater influence with regard to extension of active duty than parents or associates; (5) incentives such as economic security and fringe benefits had no appeal on those who wished to return to civilian life; and (6) those officers who expressed a desire to stay with the Air Force for a second tour of duty were less capable than the ones who wished to leave the Air Force. (See also Baker, G. W., 1953a)

1029

Baker, G. W. 1953a
TECHNICAL APPENDICES FOR HRRI PROJECT "MOTIVATION AND INTEGRATION OF NEW

OFFICERS". — Human Resources Research Inst., Maxwell Air Force Base, Ala. May 1953. vi+154 p. (Project no. 505-036-0011). AD 22 070
PB 117990s

Tabular data are presented from a questionnaire study of the attitudes of members of the Air Force Reserve Officers Training Corps (AFROTC) toward their active duty intentions (see also Baker, G. W., 1953). The chi-square test was employed to determine the trustworthiness of the differences expressed by the three sample groups. Verbal expressions concerning the 142 questionnaire items were classified according to six specific dimensions: assignment, interpersonal relations, administration and facilities, way of life, morale, and frame of reference. (AD abstract, modified)

1030

Baker, H. D., 1953
and R. G. Hattwick
DARK AND LIGHT ADAPTATION BETWEEN INTERMEDIATE LUMINANCE LEVELS [Abstract]. — Amer. Psychologist, 8 (8): 316. 1953. DLC (BF1. A55, v. 8)

Visual adaptation was measured in the course of dark adaptation from high to lower levels of luminance, and of light adaptation from low to higher luminances. A two-channel adaptometer provided a 20° adapting field of variable luminance, to which was added at intervals a 1° intensity-increment stimulus flash. The stimulus flash had a duration of 20 milliseconds and was presented both foveally and 5° parafoveally. The change in visual sensitivity during adaptation was measured by the alteration of the increment threshold as the subject underwent an increase or decrease in adapting luminance level. The dark adaptation results reveal families of smooth curves gradually leveling at the increment thresholds appropriate to the final luminance levels. Rod-cone breaks show at the dimmer parafoveal levels. The foveal light-adaptation curves are typical intensity-increment curves, but reduced in size. Parafoveal light-adaptation curves are not duplex, but are either photopic or scotopic depending on the adapting luminance employed. (Authors' abstract modified)

1031

Baker, H. D. 1953a
THE INSTANTANEOUS THRESHOLD AND EARLY DARK ADAPTATION. — Jour. Optical Soc. Amer., 43 (9): 798-803. 1953.
DLC (QC350. O6, v. 43)

The luminance threshold for a white test field, 1° in diameter, was measured before, coincident with, and immediately after the extinction of white adapting fields of various luminance levels. Foveal and parafoveal measurements were made on several subjects. The threshold begins to rise about 0.2 sec. before the onset of darkness, rises to a maximum at about the time of darkness, then falls in the dark adaptation curve. The early part of the dark adaptation curve shows an initial very rapid drop, whose slope may be different for rods and cones. The theoretical implications of the data, especially the anomalous threshold rise, are considered with respect to their general bearing on Hecht's photochemical theory. (Author's abstract)

1032

Balke, B., 1953
G. P. Grillo, E. B. Konecci, and U. C. Luft
GAS EXCHANGE AND CARDIOVASCULAR FUNCTIONS AT REST AND IN EXERCISE UNDER THE EFFECTS OF EXTRINSIC AND INTRINSIC FATIGUE FACTORS. A. WORK CAPACITY AFTER BLOOD DONATION AND AFTER EXPOSURE TO PROLONGED, MILD HYPOXIA. — School of Aviation Medicine, Randolph Field, Tex. July 1953. iii+14 p. (Project no. 21-1201-0014, Report no. 1). AD 19 693 PB 110958

Work capacity was determined during exercise on the treadmill; heart rate, blood pressure, and respiratory gas exchange in response to an increasing work load were used as criteria of performance. Experiments on the aftereffects of blood donation (500 cc.) were carried out on 14 subjects at different intervals after venesection. Within one hour after blood donation the reduction in optimal work capacity was statistically very significant as compared to repeated controls made previously. Test results obtained 48 and 72 hours after blood loss were not significantly different from the normal. Determinations on the 8th and 10th day after blood donation revealed an improvement in work capacity which was statistically significant. After an exposure of $3\frac{1}{2}$ hours to a simulated altitude of 16,000 feet in a low-pressure chamber the same criteria of performance indicated a decrease in work capacity on the borderline of statistical significance. (From the authors' summary)

1033

Bancroft, R. W., 1953
and U. C. Luft
EFFECTIVE TRACHEAL AND INTRATHORACIC PRESSURES OBTAINED WITH THE D-1 PRESSURE-DEMAND REGULATOR. — School of Aviation Medicine, Randolph Field, Tex. April 1953. iii+9 p. (Project no. 21-1201-0008, Report no. 1). AD 11 867 PB 109672

Continuous recordings were made of mask pressure and intrathoracic pressure while using automatic pressure-demand oxygen equipment at simulated altitudes in a low-pressure chamber. All regulators tested provided sufficient mask pressure to prevent the occurrence of incapacitating hypoxia at 45,000 feet. At 50,000 feet only the most recent model of the D-1 regulator supplied a mask pressure of more than 30 mm. Hg (16 inches water) which is essential in emergencies at that altitude. During normal breathing the intrathoracic pressure increased by the same increment as the mask pressure at all altitudes. This would imply that the mean lung volume was not altered by pressure breathing. In testing different voluntary breathing patterns it was found that rapid, forceful expiration followed by slow, relaxed inspiration, where-

by the chest is allowed to become inflated by the regulator pressure, required less effort and maintained a relatively low intrathoracic pressure. It is concluded that this type of breathing reduces circulatory embarrassment caused by pressure breathing and should be recommended for indoctrination of flying personnel. (Authors' summary)

1034

Bannister, R. G. 1953
THE EFFECTS ON THE RESPIRATION AND PERFORMANCE OF ADDING OXYGEN TO THE INSPIRED AIR DURING EXERCISE. [Abstract] — Jour. Physiol. (London), 120 (4): 66P-67P. 1953. DLC (QP1.J75, v. 120)

Four subjects ran on a motor-driven treadmill at a gradient and speed which caused them to stop, completely exhausted, in 6-9 min. Each subject then repeated the exercise in three further experiments in which he breathed 33, 66 and 100% oxygen respectively. The addition of oxygen to the inspired air always improved the performance considerably. The effect of 33% oxygen on ventilation, alveolar carbon dioxide tension, and blood lactate concentration was less than that of 66% or pure oxygen. When the latter were substituted for atmospheric air, the ventilation fell by 15-20 l./min., and the alveolar carbon dioxide tension rose by 5-7 mm. The inhalation of pure oxygen resulted in exhaustion between 12 and 21 min., whereas three of the subjects, when breathing 66% oxygen, had not reached their breaking point when they stopped running after 23 min. The reason for this adverse effect of pure oxygen is not known, although the subjective comments may point to a change in the cerebral circulation. In further experiments the concentration of oxygen in the inspired air was suddenly raised to 66% and later reduced equally suddenly to the atmospheric concentration. In mild exercise, in which the subjects were presumably free from the effects of oxygen lack, no corresponding change in the alveolar carbon dioxide tension or pulmonary ventilation occurred. In more severe exercise the latency of the changes in ventilation and alveolar carbon dioxide tension was much less than half a minute and may have been only a few seconds, whereas the latency of the lactate change was much greater. (Abstract, modified)

1035

Bannister, R. G., 1953a
D. J. C. Cunningham, and C. G. Douglas
THE PART PLAYED BY CHANGES IN ARTERIAL pCO_2 IN THE PRODUCTION OF HYPERPNOEA IN HEAVY EXERCISE. [Abstract] — Jour. Physiol. (London), 122 (3): 48P-49P. 1953. DLC (QP1.J75, v. 122)

Four subjects performed exercise of varying intensity on a motor-driven treadmill. The observed rise in alveolar pCO_2 above the normal resting level was insufficient to explain the increase in pulmonary ventilation in exercise. One possible explanation is that the threshold of the respiratory center to CO_2 (i.e. the level of the alveolar pCO_2 during natural quiet breathing) was lowered. To test this hypothesis, enough CO_2 was added to the inspired air during the post-exercise depression to raise the alveolar pCO_2 to the level found during the preceding exercise. The resulting ventilations were much greater than those produced by the inhalation of the same CO_2-air mixtures before the exercise and were almost comparable to those recorded during the exercise. (From the abstract)

1036

*Barbashova, Z. I. 1952
[NEW DATA ON THE MECHANISM OF ACCLIMATIZATION AND HYPOXIA] Novye dannye o mekhanizme akklimatizatsii i gipoksii. — In: Kislorodnaîa terapiîa i kislorodnaîa nedostatochnost', p. 85-92. Kiev, 1952. In Russian.

Rats and mice were subjected to anoxia to determine the following data: oxygen consumption by the tissues, the activity of certain oxydizing enzymes, the glycolytic processes, and the dye-fixating capacity of the living cerebral cortex, of the heart, of the kidney, and of the muscles. The animals were kept at simulated altitudes up to a pressure of 480 mm. Hg. for one month, 24 or 6 hours daily. The resistance of these animals increased greatly as compared to the controls; some animals lived longer than 10 minutes at a partial oxygen pressure of 24 mm. Hg. In oxygen-enriched air the oxygen consumption in the tissues of the acclimatized animals exceeded that of the controls very slightly; in an oxygen-diminished atmosphere the absorption capacity of these tissues was greater than in the controls. The author relates the above results to increases observed in the activity of succinic-acid oxidase, of anaerobial glycolysis, and of tissue resistance to any harmful influence in the acclimatized animals under hypoxic conditions. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1953 (14): 42. DNLM (ZW1.qS729)]

1037

Barch, A. M. 1953
THE EFFECT OF DIFFICULTY OF TASK ON PROACTIVE FACILITATION AND INTERFERENCE. — Jour. Exper. Psychol., 46 (1): 37-42. 1953. DLC (BF1.J6, v. 46)

The purpose of the study was to compare the amount of transfer between motor tasks (on the Two-Hand-Coordinator) that were reversals of each other when the relative difficulty of the initial task was manipulated by changing the size of the target. Five groups of 14 female college students served as subjects. During the initial task on the Two-Hand Coordinator, two of the groups practiced with a large-sized (6/8-in.) target, two groups practiced with a small-sized (1/8-in.) target, and one group practiced with a medium-sized (3/8-in.) target. After 30 trials of initial practice, both controls were reversed (Task B) for a large-, medium-, and small-sized target group, and one control was reversed (Task C) for a large- and

small-sized target group. All groups practiced with the small-sized (1/8-in.) target on the transfer tasks. Use of different target sizes during initial practice led to tasks of differing difficulty. On the first trial of Task B, the group that had the small target on Task A was significantly superior to the group that had larger targets on Task A. Similarly, for the entire 20 trials of Task C, the group that had the small target on Task A was significantly superior to the group that had the large target. The results warrant the following conclusion: As much or greater transfer is obtained between motor tasks that are stimulus-response reversals of each other than between motor tasks that are not only reversals of each other but also differ in difficulty, with the initial task being easier than the final task. (Author's abstract, modified)

1038

Bare, R. H. 1953
THE RELATION BETWEEN CRITERIA FOR B-29 TOTAL CREW PERFORMANCE AND CRITERIA FOR THE PERFORMANCE OF THE INDIVIDUAL CREW MEMBERS [Abstract]. — Amer. Psychologist, 8 (8): 316-317. 1953. DLC (BF1. A55, v. 8)

The relationship between crew performance criteria and criterion measures of the individual crew members were compared in fifty B-29 crews undergoing training and evaluation. Five crew performance criteria were derived from (a) two types of bombing scores, (b) a measure of general crew discipline, (c) a measure of the general reputation of the crew, and (d) a peer sociometric rating of the general crew reputation. The individual criteria consisted of a measure of the general reputation for different crew positions. The results show that 90% of the common variance attributable to crew criteria is explained by the criterion measures for the Aircraft Commander, Radar Operator, Bombardier, and Flight Engineer positions. Furthermore, 32% of the common variance attributable to crew criteria is explained by the aircraft commander's position alone. This latter finding suggests that the designated leader of a crew determines to a large extent the evaluation received by the crew as a whole. This study indicates that evaluations of crew performance are determined largely by the performance of four individual crew members, with the aircraft commander contributing the greatest single influence. (From the author's abstract)

1039

Barger, D. M., 1953
and R. G. Roush
A VELOCITY MODULATED RASTER DISPLAY FOR BRIGHTNESS DISCRIMINATION STUDIES. — Aug. 1953. iii+6 p. Johns Hopkins Univ., Baltimore, Md. (Contract AF 33(038)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-249 (RDO no. 694-45 and 694-43). AD 23 712 UNCLASSIFIED

The equipment described in this paper, including one modified and two standard oscilloscopes, was designed as a research instrument for the study of human brightness discrimination. Its basic function is to produce a rectangular light field consisting of a raster of vertical sweep lines on a cathode ray tube face. Independent control of the brightness of each vertical sweep line in the raster permits study of the ability of observers to detect differences in brightness in the light field as a function of the brightness differences between adjacent homogeneous fields, the relative size of adjacent fields, and the brightness contour or gradient which exists between two fields homogeneous in brightness. The detection of brightness differences on the raster can be studied by requiring observers to make verbal judgments about the apparent differences seen, or, if desired, they can be required to adjust a second raster to match the pattern of brightnesses seen on the first. (Authors' abstract)

1040

Barker, J. P., 1953
and E. F. Adolph
SURVIVAL OF RATS WITHOUT WATER AND GIVEN SEAWATER. — Amer. Jour. Physiol., 173 (3):495-502. 1953. DLC (QP1. A5, v. 173)

Rats allowed dried milk as food and deprived of fresh water, survived longer (16 days) and lost weight more slowly, when allowed to drink seawater. When seawater and food were ready-mixed, survival was sometimes enhanced. Forced feeding with dried milk and seawater usually enabled rats to survive still longer, and to lose less body weight than did ad libitum intakes of the same mixtures. Some individuals lived 45-70 days, with recovery thereafter when tap water was again allowed. Dehydrated rats formed highly concentrated urine in which maximal chloride concentrations ranging from 600-760 mEq/l. prevailed. But the water saved by urinary excretion of salts was being lost by evaporation, though evaporation also was greatly diminished by dehydration. During losses of body weight, the kidneys shrank less than the body; the adrenal glands maintained their original sizes and solid contents. Survival and weight maintenance did not depend upon tolerance of recognizable limiting factors, but upon resistance to a combination of stresses. (Authors' summary)

1041

Barron, F. 1953
THRESHOLD FOR PERCEPTION OF HUMAN MOVEMENT IN INKBLOTS, AND ITS PERSONALITY CORRELATES [Abstract]. — Amer. Psychologist, 8 (8): 317-318. 1953. DLC (BF1. A55, v. 8)

A measure of threshold for M (the Rorschach measure) was constructed and its correlates were discovered in 40 Air Force officers. The first step consisted of the serial arrangement of blots known to differ regularly in stimulus threshold (relative frequencies of M-response having been

determined in large samples), the p values in the series ranging from 0.00 to 1.00, with graduation of 0.04. The 26 blots thus finally assembled were selected from 150 blots whose stimulus thresholds had been determined. The rank order of the blot in the M-series at which the subject first gave an M response was his threshold score. Results indicated that threshold for M is significantly related to standardized measures of intelligence, personal stability, social responsibility, ethnic tolerance, and social dominance. It is related also to staff ratings on self-insight, breadth of interest, and adaptive flexibility. The correlation with rated rigidity is significantly positive. Negative correlations of border line significance are with originality, verbal fluency, and ability to communicate. (Author's abstract, modified)

1042

Barry, J. R., 1953
and G. H. Raynor
PSYCHIATRIC SCREENING OF FLYING PERSONNEL: RESEARCH ON THE CORNELL INDEX. — School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+26 p. (Project no. 21-0202-0007, Report no. 2). AD 19 615 PB 110687

The Cornell Index, a 101-item personality inventory, was administered to 1033 student pilots as part of an experimental battery of psychiatric screening tests. A revision of the test key was used to screen the potentially unfit pilot applicants. A cross-validated cutting point allowed the identification as potential psychiatric casualties of 8% of the population. The prediction was correct for 74% of the cadets screened. Motivational, emotional, and physical failures were more successfully identified than aptitude failures. (AD abstract)

1043

[Barry, J. R.] 1953a
[SELECTION OF PILOTS FOR HAZARDOUS DUTIES (Abstract)]. — Military Surgeon, 113 (5): 436. 1953. DLC (RD1.A7, v. 113)

Ordinary aptitude and intelligence tests are useful in gauging the ability of a potential flyer to perform his duties. However, they do not measure his endurance under the stress of combat, on which the success or failure of a mission and the lives of the entire crew may depend. But this quality--or its lack--can be predicted in a candidate for flight training. It is a product of the potential flyer's whole personality--his attitude toward life, his past experience, his adjustment to his social environment--and it can be found by psychiatric methods. For several years the School of Aviation Medicine has been collecting various tests of character traits, trying them out on student flyers, evaluating them against the flyers' later performance in hazardous situations such as those encountered in Korea, and from the results has been working out a standard test of emotional stability for airmen in combat. The work is not yet done. Much more observation of the actual behavior of the subjects tested is necessary, before sound criteria can be established. But enough has been learned to show that it is possible to foretell how the flyer in a perilous situation will measure up to his responsibility. (Complete abstract)

1044

Bartels, H., 1952
and G. Rodewald
[THE ARTERIAL OXYGEN PRESSURE, THE ALVEOLAR-ARTERIAL OXYGEN PRESSURE DIFFERENCE, AND OTHER RESPIRATORY DATA OF HEALTHY MEN] Der arterielle Sauerstoffdruck, die alveolär-arterielle Sauerstoffdruckdifferenz und weitere atmungsphysiologische Daten gesunder Männer. — Pflügers Archiv für die gesamte Physiologie (Berlin), 256 (2): 113-135. 1952. In German. DLC (QP1.A63, v. 256)

Potentiometric determinations of arterial oxygen tension carried out on 59 healthy men breathing air at an atmospheric pressure of 759 mm. Hg revealed values of 92.95 ± 5.6 mm. Hg. Values of alveolar-arterial oxygen tension differences vary according to the methods employed: determined by the Haldane-Priestley expiration method, the difference is 4.85 ± 5.4 mm. Hg; according to a formula developed by R. L. Riley, et al. (Amer. Jour. Physiol., 147 (1): 191-198. 1946), it is 7.7 ± 5.2 mm. Hg. The mean oxygen saturation of the arterial blood was found to be 95.84 ± 2.7%. The mean oxygen capacity, determined by four different methods, amounted to 19.92 ± 1.3 vol.%. In 31 measurements the CO_2 saturation of the arterial blood was found to be 50.2 ± 2.6% and the CO_2 saturation of the blood serum 61.0 ± 3.3%. An analysis of the alveolar air using the Haldane-Priestley method gave the following results: partial pressure of CO_2 = 4.9 ± 2.1 mm. Hg; and partial pressure of O_2 = 97.8 ± 5.2 Hg. Mean respiratory quotients determined experimentally (0.81) differ from those calculated by Riley's formula (0.76).

1045

Bartels, H., 1953
and G. Rodewald
[THE ALVEOLAR-ARTERIAL OXYGEN PRESSURE DIFFERENCE AND THE PROBLEM OF GAS EXCHANGE IN THE HUMAN LUNG] Die alveolär-arterielle Sauerstoffdruckdifferenz und das Problem des Gasaustausches in der menschlichen Lunge. — Pflügers Archiv für die gesamte Physiologie (Berlin), 258 (3): 163-176. 1953. In German. DLC (QP1.A63, v. 258)

The alveolar-arterial oxygen pressure difference was determined in 53 healthy male subjects, 22-42 years of age, under conditions of anoxia, hyperoxia, and breathing air. Alveolar air was collected using a modified version of the Haldane-Priestley method (the air sample being retrieved at the middle, instead of at the end, of expiration). Arterial oxygen pressure was determined potentiometrically on blood taken from the femoral

artery. To increases of arterial oxygen pressure of 28-552 mm. Hg, corresponded increases of alveolar-arterial oxygen pressure difference of 4.5-39 mm. Hg. The following interpretations are given for the pressure difference increase: (1) When breathing air or during hyperoxia, a greater portion of the circulating blood bypasses the pulmonary capillaries ("short-circuit" factor) thus contributing a smaller portion of O_2 to the arterial blood. (2) Under conditions of hypoxia the blood remains longer in the pulmonary capillaries. And (3) the pulmonary "diffusion capacity" is increased during hypoxia.

1046

Barthol, R. P. 1952
ERRORS IN VISUAL SIZE-MATCHING IN THE FLEXIBLE GUNNERY TASK. — Human Resources Research Center. [Armament Systems Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. FG 52-2, July 1952. 6 p. (Project no. 512-024-0001).
ATI 168 878 UNCLASSIFIED

An aerial gunner's basic task is to "track" (i.e. follow) an attacking plane with his sight, measure the apparent wing-span of the plane with a "framing" device, and press the trigger. The framing gives the data needed for computing the range of the attacking plane. This study examines some of the aspects of framing assuming that the tracking is accurate. The particular sight that was studied utilizes a circular arrangement of diamond-shaped dots to form the reticle that frames the plane. Twenty-seven trained, and 47 new student gunners were employed. From the results of the experiment the following conclusions are drawn: (1) gunners trained or untrained can recognize a correct sight picture over 75% of the time, apparently regardless of the size of the plane; (2) errors are maximized when the airplane is "overframed" and the differences are relatively small; and (3) trained student gunners do not perform significantly better than the unexperienced gunners. It is assumed that factors of perceptual organization may operate to maximize certain overframing errors.

1047

Bartlett, D. J., 1953
and D. G. C. Gronow
THE EFFECTS OF HEAT STRESS ON MENTAL PERFORMANCE. — Flying Personnel Research Committee, (Gt. Brit.). Report no. FPRC 846, Aug. 1953. 16 p. AD 30 748 UNCLASSIFIED

The possible effects of different kinds of heat stress upon anticipatory perception and judgment were investigated. Several displays given to subjects represented aircraft which were to be perceived as moving, according to assigned rules, from square to square on a card. In some instances these moves would result in aircraft collision. Subjects were required to decide (1) how many, if any, such collisions would occur on any given card; (2) which aircraft would be effected; and (3) where the collision would occur. The climatic conditions experienced were room temperature (60°-70° F.), 80°/70° F. dry/wet bulb, 90°/80° F. dry/wet bulb, and 100°/90° F. dry/wet bulb. Each of 24 subjects was exposed to the hot conditions for $\frac{1}{2}$ hour before testing and during the $\frac{1}{2}$-hour tests. Results indicated that while performance was significantly affected by increase in the number of aircraft presented and by the card display size, no important effect was caused by heat level or the assigned rate of extent of movement of aircraft. (AD abstract)

1048

Bartlett, F. 1952
PSYCHOLOGICAL CRITERIA OF FATIGUE. — In: Ross, S., Report on "Symposium of Fatigue" ..., p. 1-3. Univ. of Maryland, College Park. Technical Report No. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

In the study of fatigue, we need indicators of the early stages of fatigue and we must find a consistent feature of performance. We should look for criteria of fatigue that lie within the performance itself. In an ergographic situation we can, for example, measure: (1) reaction lag; (2) contraction; (3) directional change of contraction to relaxation; (4) relaxation. Normal subjects fall into this sequence, but as exercise is continued, irregularities can be found in this succession. The initial reaction lag is the last to change. In other tasks like driving a car, flying a plane, etc., we can see evidence that the earliest change is increasing irregularity in the internal timing of the performance. There is some evidence that changes of this kind occur more frequently in paced performance than in free performance. Most of our motor skills involve responses to a changing display. Lapses of behavior or unexpected or unaccountable behavior mark advancing fatigue and reflect the "disintegration of the field of display", so that the right action is done at the wrong time. In advancing states of fatigue there are always reports of discomfort, frustrations, etc. There may be localization of pains. In general, there is a "preoccupation with the performance". (S. Ross's summary, modified)

1049

Bartlett, F. 1952a
RADAR DISPLAY RESEARCH AT THE RAF RADAR RESEARCH UNIT. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 801, Aug. 1952. 4 p. TIP U71615. UNCLASSIFIED

In view of the complexity of factors involved, the validity and reliability of scoring performance of radar operators by using normal operational equipment is questioned. A number of conclusions were reached: (1) a normal observer deals best with a display that appears on a relatively bright screen; (2) no visual deterioration or other fatigue symptoms are observed during radar operation within an observation period of 15 minutes; (3) the minimal brightness at which a signal is consistently detected remains constant, although values vary with varia-

tions in the frequency of display appearance; (4) signal shape, size, and uniformity are important elements in signal detection; and (5) speckly, broken-up, or nonuniform appearance of background "noise" considerably affects signal detection, while homogeneous background "noise" does not exert too much interference. Recent experiments with laboratory-controlled display units promise to yield more specific results.

1050

Bartlett, P. V. 1953
INSTALLATION OF LIQUID OXYGEN EQUIPMENT IN AIRCRAFT. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Memorandum Report no. WCRD 53-73, June 16, 1953. 31 p. (E. O. no. S-660-139). AD 30 332 UNCLASSIFIED

Containers were developed which can store liquid oxygen and convert the liquid oxygen to gaseous oxygen at ambient temperatures. Satisfactory performance of these containers was established by laboratory tests, flight tests in WADC aircraft, and approximately 1 year of service in 25 production-type F-84E airplanes modified to have a liquid oxygen supply. Data are appended which cover the aircraft installation requirements for oxygen systems having a liquid oxygen supply. (AD abstract)

1051

Bartley, S. H. 1952
BRIGHTNESS COMPARISONS WHEN ONE EYE IS STIMULATED INTERMITTENTLY AND THE OTHER EYE STEADILY. — Jour. Psychol., 34 (2): 165-167. 1952. DLC (BF1.J67, v. 34)

Comparative brightness perception tests were made under several conditions. First readings were taken with a septum dividing the fields of view of the two eyes. Readings were taken when the left target was intermittent with a light-dark ratio of 1, and when both targets were steady. In the second part of the experiment the same procedures were used except that, as a control, the septum was removed. For each of the four conditions, and for each of two observers (A and B), 100 readings were taken. The following conclusions were reached: (1) For observer A, intermittent stimulation with no septum was 85%, and for B, under the same conditions, it was 58% as effective towards brightness enhancement as steady stimulation. With the septum, the two forms of stimulation were equally effective for both A and B. (2) When both the left and right targets were held steady and equated in brightness, with the septum in place, for subject B the left target was more effective than the right. However, when the septum was removed and both eyes were confronted with both targets, the left and right eyes required equal intensities of light for the two targets to match in brightness. And (3) the findings for the right eye (steady stimulation) with the septum removed was adopted as a standard with which to compare the behavior of the left eye. It was found that: (1) the intermittent target with the septum was as effective as the steady stimulation for B just as it was for A; (2) intermittent stimulation was more effective in perceiving brightness when it fell upon an eye that was not stimulated by a steady light from some other source.

1052

Barwood, A. J. 1953
EMERGENCY ESCAPE AND SURVIVAL. — Proc. Roy. Soc. Med. (London), 46 (7): 523-526. 1953. DLC (R35.R7, v. 46)

This paper is one of a series devoted to the problems of survival in aviation, particularly from altitudes over 40,000 ft. The author discusses the conditions which must be satisfied in order to ensure the maximum chance of survival during and after escape from aircraft. Considerations of survival must influence the design of aircraft, of clothing, of protective devices used by crew members, of escape mechanisms, and of auxiliary equipment, e.g., automatically opening parachutes and survival packs designed for any kind of global surface. Survival in isolated areas or under conditions of extreme cold presents particular problems as far as accessory equipment is concerned. The author elaborates on the type of gear which should be packed for flights over each of these specific areas. Training of aircrew personnel in the use of survival equipment under each of the various conditions is considered an important factor in survival.

1053

Basowitz, H., 1953
S. J. Korchin, and R. R. Grinker
RESPONSE TO A LIFE STRESS: THE EXPERIENCE OF ANXIETY [Abstract]. — Amer. Psychologist, 8 (8): 318. 1953.
DLC (BF1.A55, v. 8)

One hundred healthy candidates for airborne training prior to training were tested for hippuric acid excretion. All of the values were found to lie within a normal range. The ten highest and ten lowest individuals in hippuric acid (HA) excretion were then selected; it was assumed that the former group would manifest greater susceptibility to anxiety under stress of training. The subjects were required to rate themselves on (a) fear of injury (guilt) and (b) fear of failure (shame) on each of three days before, daily during three weeks of training, and on two days after training.

Results indicated that ratings for failure were higher than those for fear of injury within each group. During the pretraining phase and on the first day of training the two groups did not differ appreciably in mean ratings on both scales. However, on every training day thereafter, the injury scale showed a consistently higher mean level of anxiety and more variability of mean scores in the high HA group. The failure scale revealed a similar trend, although with some reversals. Both groups showed a relative heightening of anxiety on two scales three days after graduation. (Authors' abstract)

1054

Bean, J. W., 1953
and Charles W. Smith
HYPOPHYSEAL AND ADRENOCORTICAL FACTORS IN PULMONARY DAMAGE INDUCED BY OXYGEN AT ATMOSPHERIC PRESSURE. — Amer. Jour. Physiol., 172 (1): 169-174. 1953. DLC (QP1.A5, v. 172)

Hypophysectomized and nonhypophysectomized male albino rats were continuously exposed to O_2 in concentrations of from 90 to about 98% at atmospheric pressure in a chamber from which CO_2 was continuously absorbed. The nonhypophysectomized animals became dyspneic and lethargic within 20 hours of exposure and rapidly deteriorated. Several succumbed within 45 hours and all had succumbed or were killed in terminal states within 70 hours of exposure. The thoraces were filled with clear, watery, bloodless fluid which clotted firmly on standing. The lungs were a deep brownish purple color, of rubbery consistency, and devoid of air. The massive hydrothorax may help explain the decreased vital capacity commonly seen in exposures to O_2 at atmospheric pressure. In contrast to these findings, all the hypophysectomized animals were still active but dyspneic when killed after 70 hours of exposure. The thoraces contained little free fluid. The lungs were of normal appearance and all were fully air-containing. Hypophysectomy protects against pulmonary damage inflicted by O_2 by eliminating or diminishing those principles which in the normal animal augment the susceptibility of pulmonary tissue, particularly the vascular bed, to injurious effects of O_2 in high concentrations. Corticotropin and cortical hormones constitute important parts of this augmentatory mechanism but are not essential to the precipitation of injury by O_2. The possibility that increased CO_2 is a causative factor is discussed. (From the authors' summary)

1055

Beard, E. F., 1953
A. L. L. Bell, and T. W. Howell
DYNAMICS OF BLOOD FLOW UNDER ABNORMAL PRESSURE: CIRCULATORY AND RESPIRATORY RESPONSES TO ACUTE HYPOXIA IN ANIMALS "ACCLIMATED" TO ALTITUDE. — School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii + 10 p. (Project no. 21-1204-0001, Report no. 1). AD 24 098 PB 112891

Dogs were kept almost continuously at a simulated altitude of 20,000 feet in a low-pressure chamber for 7 to 15 weeks and then were used for acute hypoxia experiments performed under anesthesia, using 8.5% oxygen in nitrogen to produce the acute hypoxic episode. While breathing ambient room air, these animals showed cardiac index values lower than those expected in normal dogs under similar circumstances, a low to normal systemic arterial pressure, but a well-defined pulmonary artery hypertension. During exposure to the oxygen-poor mixture, the following observations were made: a moderate increase in minute volume of respiration; a significant average increase of 1.0 liter/minute/meter^2 in cardiac index; significant average increases in femoral artery systolic and diastolic pressures; and a significant average increase in the already high pressures within the pulmonary artery reflected in systolic, diastolic, and mean values. Following the acute hypoxic episode, all of these variables returned to control levels (except for femoral diastolic pressure which fell slightly below control levels). Possible mechanisms of some hemodynamic differences between these dogs and normal animals are suggested. (From the authors' abstract)

1056

Beard, E. F., 1953a
A. L. L. Bell, and T. W. Howell
CIRCULATORY AND RESPIRATORY RESPONSES TO ACUTE HYPOXIA IN DOGS RENDERED MILDLY ANEMIC BY HEMORRHAGE. — School of Aviation Medicine, Randolph Field, Tex. Oct. 1953. iii+8 p. (Project no. 21-1204-0001, Report no. 2). AD 29 352 PB 114061

Ten mongrel dogs were hemorrhaged by 10 cc. of blood per kilogram of body weight and 24 hours later were used for acute hypoxia experiments performed by a standardized method previously used for studying hemodynamics of acute hypoxia in normal dogs and in dogs "acclimated" to chronic hypoxia. During the hypoxic episode the anemic dogs showed large increases in pulmonary ventilation, cardiac output, and pulse rate. Fifteen minutes after the hypoxic episode these variables had not returned to pre-exposure levels. Femoral artery pressures rose moderately during hypoxia, but changes in pulmonary artery pressure were slight and more variable. The cardiovascular and respiratory systems of the animal with a deficiency of circulating hemoglobin, insufficient in itself to produce hemodynamic changes, seemed to respond to hypoxia in a manner qualitatively similar to those of normal animals. However, the magnitude of changes seemed greater, and return to normal of the variables measured following the hypoxic episode was incomplete after a recovery period found sufficient for normal animals. (From the authors' summary and conclusions)

1057

Beard, E. F., 1953b
A. L. L. Bell, and T. W. Howell
CIRCULATORY AND RESPIRATORY RESPONSES TO ACUTE HYPOXIA IN ANIMALS "ACCLIMATED" TO ALTITUDE. — Jour. Aviation Med. 24 (6): 494-507. 1953 DLC (TL555.A1A4, v. 24)

Ten dogs were kept at a simulated altitude of 20,000 feet in a low-pressure chamber for 7-15 weeks. These animals, when exposed to ambient air, showed cardiac indexes lower than those of normal dogs. Also, the acclimated dogs had low to normal arterial pressures when compared to the control animals. There was, however, a well defined pulmonary artery hypertension in the test dogs. When these acclimated dogs were placed in an oxygen-poor (8.5%) atmosphere under anes-

thesia, there occurred an increase in minute volume of respiration, an increase in cardiac index, increases of both systolic and diastolic pressures, and a further increase in the pulmonary artery pressure. Compared to normal dogs under the same conditions, the increase in pulmonary arterial tension was the only physiological change which was at variance with the data taken on the normal animals.

1058

Bechtoldt, H. P., 1953
and R. F. Mager
STIMULUS PRESENTATION DEVICES FOR USE IN STUDIES OF DISCRIMINATION ABILITIES. — State Univ. of Iowa, Iowa City. (Contract AF 33(038)-13215); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-23, July 1953. iv+35 p. (Project no. 509-020-0009). AD 19 464
PB 112304

The two pieces of apparatus described in this report are used to measure aspects of human behavior in response to visually presented stimuli. The first of these devices is a tape reaction time unit which makes possible the presentation of sequences of stimuli, with variations in the pacing of this presentation, and the measurement of time of reaction to each stimulus. The second apparatus is a projector reaction time unit, which also permits the presentation of sequences of visual materials and measures the reaction time of a human observer to the stimuli. Both of these devices were designed for use in measuring aspects of human abilities which are possibly not measured by means of paper-and-pencil tests—those aspects which may be related to the pacing of the task and the speed of reaction. The tape device is designed to permit either paced or self-paced operation. The operating characteristics, procedures, and the construction of the devices are described in detail. (Authors' summary)

1059

Bechtoldt, H. P. 1953a
FACTOR ANALYSIS OF THE AIRMAN CLASSIFICATION BATTERY WITH CIVILIAN REFERENCE TESTS. — State Univ. of Iowa, Iowa City (Contract no. AF 33(038)-13215); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-59, Dec. 1953. iv+51 p. (Project no. 509-020-0008).
AD 24 652 UNCLASSIFIED

This research was designed to assist in the cross identification of the results of factor studies by (1) providing evidence of the factorial composition of the tests in the Air Force Airman Classification Battery (ACB) in terms of primary mental abilities (PMA) tests used in civilian studies, (2) investigating the degree of configurational invariance in the first- and second-order domains when an objective criterion of an oblique simple structure is utilized, and (3) investigating the factors in the perceptual-speed domain and the relation of the hypothesized factors in this domain to well-established cognitive factors. A battery of 62 variables was assembled, and correlations were determined from the single-digit coded scores of 203 basic airmen tested during August 1950. The resulting oblique simple structure led to identification of 13 first-order factors and 4 second-order factors. The first-order factors were identified by the Chicago tests of PMA, parts of the ACB, and additional reference tests of several perceptual-speed factors. The second-order factors were defined by the first-order factors. First-order factors not previously identified with airmen samples were symbol perception, coding facility, apparent adjustment, and form perception. The 3 second-order factors of the 4 predicted were speed, mechanical ability, and a broad intellect. (AD abstract)

1060

Becker, E. L., 1953
J. E. Hodler, and A. P. Fishman
EFFECT OF CARBONIC ANHYDRASE INHIBITOR (6063) ON ARTERIAL-ALVEOLAR CO_2 GRADIENT IN MAN. — Proc. Soc. Exper. Biol. and Med., 84 (1): 193-195. 1953. DLC (QP1.S8, v. 84)

The purpose of this study was to determine whether the carbonic anhydrase inhibitor, Diamox ("6063", or 2-acetylamino-1, 3, 4-thiadiazole-5-sulfonamide) in concentrations adequate to inhibit renal acid excretion, would interfere with the transport of carbon dioxide from pulmonary capillary blood into the alveoli in normal, non-anesthetized human subjects. An indwelling urethral catheter and a brachial arterial cannula were placed in position, and observations were begun one-half hour later. Expiratory gas, arterial blood and urine were collected and analyzed. Determinations were made of the carbon dioxide and oxygen content of expired gas and of the pH of blood and urine. Arterial pCO_2 was then calculated. Sodium and potassium concentrations were determined with a flame photometer. In two subjects at rest and in one mildly exercising, Diamox caused an increase in sodium, potassium and bicarbonate excretions, as well as an increase in urine production. In neither case was there an interference with carbon dioxide elimination from pulmonary capillary blood into alveolar air. The author interprets this lack of effect on pulmonary carbon dioxide excretion as possibly due to the large concentration of carbonic anhydrase in the human erythrocyte.

1061

Beckman, E. L., 1953
J. E. Ziegler, T. D. Duane, and H. N. Hunter
PRELIMINARY STUDIES IN PRIMATES SUBJECTED TO MAXIMUM SIMPLE ACCELERATIVE LOADS. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5301, May 22, 1953. iii+117 p. (Project Report no. NM 001 060. 10. 02)
AD 15 117 UNCLASSIFIED

A survey was made of the literature regarding human tolerance to simple and combined accelerative stress. The tolerance of chimpanzees to simple positive, negative, and transverse g loads was measured, and applications were made to human tolerance levels. No demonstrable pathophysiological changes occurred when the animal was subjected for 15 seconds to 40 transverse g or to 40 positive g. Unconsciousness was produced with approximately the same positive g load as for humans, but this level in chimpanzees was well below the level necessary for the rupture of tissue. Irreversible changes in the central nervous system and general tissues occurred after 15 sec. of 40 negative g. Calculations indicated that safe human tolerance levels to positive and transverse g could be maintained with gradually increasing increments of magnitude up to 15 g and gradually increasing durations up to 5 sec. maximum. Human tolerance to negative g is not considered safe with greater than 3 g for 15 sec. or 5 g for 1 sec. until further investigation is made. (AD abstract)

1062

Beckman, E. L., 1953a
T. D. Duane, J. E. Ziegler, and H. N. Hunter
HUMAN TOLERANCE TO HIGH POSITIVE G APPLIED AT A RATE OF 5 TO 10 G PER SECOND. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5302, June 3, 1953. iii+50 p. (Project Report no. NM 001 060.10.03). AD 20 520
UNCLASSIFIED

Investigations were made to determine more accurately the voluntary human tolerance to high positive g loads applied at the rate of 5-10 g/second. Measurements were made on 5 adult human males at 15, 12, 10, and 6 g and upon 7 subjects at 8 g Subjects were safely exposed to accelerative loads of 15 g. for durations of 1-1.8 sec. if the loads were applied at a maximum rate of 8-10 g/sec. When subjects were exposed to 15-g loads applied at 8 g/sec., unconsciousness was sometimes produced if the maximum-load duration was greater than 0.5 sec. The visual symptoms of graying, peripheral-vision loss, and blackout were not considered to be premonitory signs of impending unconsciousness when the load was 8 g or more applied at 7 g/sec. or more. Unconsciousness produced as a result of loads of 8-15 g applied at 7-9.6 g/sec. did not produce clinically demonstrable sequelae. (AD abstract)

1063

Beckman, E. L., 1953b
J. E. Ziegler, T. D. Duane, and H. N. Hunter
SOME OBSERVATIONS ON HUMAN TOLERANCE TO ACCELERATIVE STRESS. II. PRELIMINARY STUDIES ON PRIMATES SUBJECTED TO MAXIMUM SIMPLE ACCELERATIVE LOADS. —
Jour. Aviation Med., 24 (5): 377-392. 1953
DLC (TL555.A1A4, v. 24)

Essentially a condensation of the report, Beckman, E. L., 1953a.

1064

Beem, J. R., 1952
C. R. Honig, and D. F. Davies
EFFECT OF APPLIED EXTERNAL PRESSURE ON CARDIOVASCULAR DYNAMICS. — Federation Proceedings, 11 (1[I]): 10-11. 1952.
DLC (QH301. F37, v. 11)

Effects of applied abdominal and peripheral pressure on cardiovascular hemodynamics and respiration were measured by a photokymograph in 11 subjects in the resting horizontal position. Ballistocardiographs were recorded by means of an electronic transducer, and blood pressures by a strain gauge with intra-arterial catheter. Photoelectric plethysmographs, electrocardiograms, and pneumographs were recorded by the usual methods. Tracings were taken during inflation of specially constructed bladders about calves, thighs, and abdomen, to 100 mm. Hg. Cardiac output generally increased immediately and systolic and diastolic blood pressures always increased when the abdominal bladder was inflated alone or in combination with the leg bladders. Inflation of leg bladders alone had negligible effect on cardiac output and slight transient effects on blood pressure. Whenever leg bladders were filled, toe plethysmographs indicated congestion. On release of pressure the effects noted were in the opposite direction. Electrocardiographs frequently showed evidence of change in axis deviation when the abdominal bladder was inflated. Pulse wave contours usually showed a descent and deepening of the dichrotic notch when the abdominal bladder was inflated. (From authors' abstract)

1065

*Beketaev, A. M. 1952
[ON THE DURATION OF BULBAR FUNCTIONS UNDER CONDITION OF DIFFERENT DEGREES OF OXYGEN WANT] O prodolzhitel'nosti zhiznedeĭatel'nosti bul'barnykh tsentrov v usloviĭakh razlichnykh stepeneĭ kislorodnogo golodaniĭa. — Izvestiĭa Akademii nauk Kazakhskoĭ SSR, No. 121, Seriĭa meditsiny i fiziologii, 1: 28-72. 1952. In Russian. DLC (QP1. A4222, v. 1)

Tests of the vital functions of respiratory and vasomotor centers were carried out on anesthetized dogs whose blood flow to the brain was interrupted by clamping off the carotid and vertebral arteries. Stimulation thresholds of these centers were established 1-2 minutes before clamping off the arteries. The first minutes of hypoxia were characterized by an increased stimulation of the centers. Complete cessation of reflex stimulation was observed at different time intervals after clamping of the arteries (11 minutes to 1 hour or more). Three to 24 minutes after release of blood flow to the brain, the interrupted reflex stimulation capability of both bulbar centers reappeared in the majority of cases in response to strong faradic stimulation. Restoration of vasomotor reflexes usually appeared before the restoration of respiratory reflexes. Restoration of the reflex stimulation of both centers to normal was observed at dif-

ferent intervals. Experimental data showed that the vital functions of the bulbar centers are better preserved under conditions of short and complete, than during prolonged incomplete anemia of the brain. [Abstract in: Sovetskoe meditsinskoe obozrenie, Fiziologiîa (Moskva), 1954 (18): 48. DNLM (ZW1. qS729)]

1066

Bell, A. L. L. 1953
AN INSTRUMENT TO FACILITATE MEASUREMENT OF OXYGEN AND CARBON DIOXIDE TENSION IN BLOOD BY THE DIRECT METHOD. — School of Aviation Medicine, Randolph Field, Tex. Special Report, Sept. 1953. AD 19658
UNCLASSIFIED

An instrument is described which increases the accuracy and facilitates measurement of the air-bubble length in the Roughton-Scholander syringe which is employed in the direct method (Jour. Biol. Chem., 161: 621-633, 1945) of determining oxygen and carbon dioxide tensions in the blood. Important features of construction are the adjustable mounting clip for the syringe, the full side-to-side movement of the scope, a direct-reading centimeter scale, the fine-adjustment mechanism with release for rapid movement, and the optical system. (AD abstract)

1067

Belostotskiĭ, E. M. 1952
[A NEW ADAPTOMETER FOR EXAMINATION OF NIGHT VISION] Novyi adaptometer dlîa issledovaniîa nochnogo zreniîa. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 10: 123-127. 1952. In Russian.
DNLM (W1 PR 5815, v. 10)

A new apparatus for the examination of night vision is described which enables one to determine the light sensitivity of the eye in as little as 3 to 4 minutes. Visual acuity under weak lighting conditions, and sensitivity of the eye to blinding light, are also determined. The light intensity of the test chart can be changed gradually. Light intensities during preliminary light adaptation can be changed 2, 4, or 8 times. The test objects are of 3 shapes (circle, cross, and square). There are 3 charts for the visual acuity test displaying a variety of test-figure positions. A red fixation point of changeable intensity is situated 12° above the center of the test plate. Readings are expressed in optical density units and are directly plotted on curves. The possibility of changing the light intensities of the test chart, the variety of forms, and the great range of luminosity of the test objects secure objective data.

1068

Belostotskiĭ, E. M. 1953
[DEPTH PERCEPTION AND HEAD MOVEMENTS] Glubinnoe zrenie pri dvizhenii golovoĭ. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 8: 341-345. 1953. In Russian.
DNLM (W1. PR5815, v. 8)

An attempt was made to demonstrate that depth perception is based on the coordination of cues derived from binocular vision with those derived from experience. The conventional depth-perception test apparatus was used, and threshold depth perceptions were determined for various positions of two sticks in regard to the sagittal plane, looked at from different distances and at different head positions. Ninety tests were performed on 5 well-trained subjects. Binocular depth perception is impaired in the case of horizontally placed objects, as compared to objects placed vertically. Under identical circumstances, monocular depth perception does not change at any position of the objects. For horizontal objects, both binocular and monocular observations give the same results. The mutual position of vertical objects can best be judged when the head moves in a plane perpendicular to that of the objects; the greater the parallax, the longer the time of correct distinction. Depth perception is constant in the first 18-25 seconds of observation. The suggested method makes it possible to determine with sufficient exactness the influence of side stimulation on depth perception. Data show that noise alters the temporary threshold curve.

1069

Benford, R. J. 1953
THE ATTAINMENT OF SPECIALTY RECOGNITION FOR AVIATION MEDICINE: ROLE OF INTERIM BOARD IN PETITIONING FOR CERTIFICATION. — Jour. Aviation Med., 24 (2): 101-106, 130. 1953. DLC (TL555. A1A4, v. 24)

A recent decision of the Council on Medical Education and Hospitals of the American Medical Association, authorizing board certification in aviation medicine by the American Board of Preventive Medicine, brings to a successful conclusion nearly ten years of planning and effort by the Aero Medical Association to gain full and complete recognition for this specialty. The special requirements for certification in aviation medicine are given.

1070

(Benox Report) 1953
BENOX REPORT: AN EXPLORATORY STUDY OF THE BIOLOGICAL EFFECTS OF NOISE. — Univ. of Chicago, Ill., Dec. 1, 1953. v+116 p. (Contract N6ori-020, Task Order 44). AD 24 685
PB 114936

See (Chicago Univ.), 1953

1071

Benson, O. O. 1953
AEROMEDICAL INTERESTS: LOOKING FORWARD. — Advisory Group for Aeronautical Research and Development, Paris. Proceedings of the Third AGARD General Assembly (London), Sept. 3-11, 1953, p. 90-92. AD 70 449
PB 117374

One of the chief problems facing aeromedical

research within the framework of the NATO organization is the need to delineate the human factors as related to design and development of military aircraft. The aeromedical scientists encounter greater difficulties in obtaining constant data on the "full faculty" performance of aviators in relation to new designs and equipment than the engineers, who are dealing to a lesser degree with unknown variables. Aeromedical efforts should be directed into the following main channels: (1) Protection of the aircrew against environmental hazards, which are known qualitatively but need constant quantitative revision as aircraft performance increases. (2) Provision for optimum aircrew effectiveness throughout flight. And (3) Provision for contingencies, such as the need for emergency escape and survival. — The address closed with the presentation of and comments on a film on the Aerobee weightlessness experiments (cf. Henry, J. P., 1952).

1072

Benson, O. O. 1953a
TRENDS AND TRANSITION IN AEROMEDICAL PROBLEMS WITH A VIEW TOWARD THE NEXT TEN YEARS. — Aeronaut. Eng. Rev., 12 (4): 45-49. 1953. DLC (TL501.A326, v. 12)

The most important aeromedical problems in high-speed and high-altitude flight stem from pilot error, loss of cabin pressure, and escape from craft. The following aspects are discussed in some detail: (1) the physiological implications of high-altitude flight and decompression; (2) the limitations imposed by g-tolerance at high speeds (e. g., with regard to turns); (3) sealed cabins (representing a closed ecological system using compressed nitrogen to maintain pressure); (4) the "heat barrier"problem (implying the need of air-conditioned suits in future flights); (5) escape from the aircraft at high altitudes by means of an ejection capsule; and (6) the problem of stabilizing the rotational or spin forces around the axis of the human body.

1073

Benson, O. O. 1953b
TRENDS AND TRANSITION IN AEROMEDICAL PROBLEMS WITH A VIEW TOWARD THE NEXT TEN YEARS. — Royal Thai Air Force Med. Gaz. (Bangkok), 2 (4): 289-300. 1953. In English. DNLM

Same as paper, Benson, O. O., 1953.

1074

Beranek, L. L. 1952
UNSOLVED MILITARY NOISE PROBLEMS. — Jour. Acoust. Soc. America, 24 (6): 769-772. 1952. DLC (QC221.A4, v. 24)

Potential areas of jet and propeller-driven plane noise disturbances in the vicinity of military air fields are graphically represented. Regions of major nuisance extend to a distance from the airport of 4 and 16 miles for propeller-driven and jet planes, respectively. Future tasks of research in noise abatement are outlined. The following suggestions have been advanced: use of propellers with low tip speeds and with increased numbers of blades, muffling exhausts, helicopter forward-flying plane combinations, and producing noise out of phase with the principal propeller components to "buck out" the lower frequency components. Research on jet noise has indicated that such noise is produced from three sources: from up-stream inside the nozzle, from shear at the turbulent boundary layer outside the nozzle, and from ring vortices produced either at the nozzle or within the jet pipe.

1075

Bergeret, P. 1953
[FATIGUE IN JET PILOTS] La fatigue du pilote d'avion à reaction. — Médecine aéronautique (Paris), 8 (3): 290-311. 1953. In French. DLC (TL555.M394, v. 8)

Causes, manifestations, pathogenesis, diagnosis, prevention, and therapy of fatigue in jet pilots are analyzed in great detail. Although fatigue experienced by jet pilots has a few inherent features, in its entirety it is just a variation of fatigue in pilots of propeller-driven airplanes. As is usually the case in fatigue, the etiology and manifestations of this condition in jet pilots are rather complex, the chief characteristics being of nervous and psychological origin. Besides the cumulative effect of repeated exposure to acceleration, nervous tension, induced by the stress from piloting an airplane at high altitudes, is of utmost importance in the etiology of fatigue. There is no objective criterion whereby the onset of fatigue in jet pilots can be detected. However, the medico-physiological supervision of the units is the best safety measure in disclosing individual deficiencies. Furthermore, limiting the hours of flying and taking proper rest is the best preventive treatment for fatigue.

1076

Bergin, K. G. 1953
CIVIL AIR TRANSPORT PROBLEMS. — In: The biology of flying, p. 1-4. Aeronautical Research Council (Gt. Brit.). Engineering Physics Subcommittee, London. Report no. E. P. 240, May 21, 1953. AD 23 124 UNCLASSIFIED

Also published in: Advancement of Science (London), 9 (36): 375-377. 1953. DLC (Q41.B812, v. 9)

A brief review is presented of matters pertaining to: (1) aircrew health and hygiene; (2) anoxia and its relation to constitutional and physiological factors; (3) aviation deafness; (4) transportation of patients and invalids; (5) air sickness and its prevention; (6) preventive measures against introduction of communicable diseases through air passengers; and (7) control of atmospheric conditions in aircraft, heat and moisture control.

1077

Bergin, K. G. 1953a
THE CARE OF FLYING PERSONNEL. — Medical Press (London), 229 (8): 184-186. 1953. DNLM

Consideration of the medical problems of civilian flying personnel is imperative in safe and efficient operation of civilian air lines. Physical,

mental, and psychological conditions of all flying personnel influence the performance of the crew. Medical examinations must insure high health standards, and special attention must be given to sight, hearing, and cardiovascular and central nervous systems. Examinations should be scheduled regularly (every six months to a year), or after illnesses or accidents. All of the factors which might influence the health of the crew during a flight assignment should be routinely checked by the airline's medical officer.

1078

Bergin, K. G. 1953b
THE TRANSPORT OF INVALIDS BY AIR. — Medical Press (London), 229 (8): 186-190. 1953. DNLM

Pressurized and temperature- and humidity-controlled cabins of commercial air liners have provided passengers with such comfort in flight that requests for transportation of patients may be accepted within the limitations mentioned below. The majority of surgical and medical cases, including head injuries, may travel in pressurized cabins, depending upon the distance to be travelled the duration of flight, and the type of craft. A limited number of surgical cases involving the gastrointestinal tract, the central nervous system, or the endocrines should not fly. Patients suffering from diseases of the cardiovascular system or the respiratory system, diseases of the blood, mental disturbances, or infectious diseases, likewise, should be prevented from flying. In some special cases, sedation or airsickness remedies may be administered prior to flight.

1079

*Beritashvili, I. S., 1952
and S. N. Khechinashvili
[ON THE IMPORTANCE OF THE VESTIBULAR ANALYSOR IN SPATIAL ORIENTATION] K voprosu o znachenii vestibulíarnogo analizatora dlía prostranstvennoĭ orientatsii. — Soobshcheniia Akademii nauk Gruzinskoĭ SSR, 13 (7): 427-431. 1952. In Russian.

Spatial orientation was tested in 8 dumb-mute and 3 normal subjects proceeding along a simple or a complex route or subjected to passive rotation. The results lead to the conclusion that in subjects with normal hearing, vestibular stimulation, in conjunction with visual and kinesthetic stimulations, forms a stimulation complex which signals orientation movements and turnings in space. Stimulations of receptors in the inner organs of the body occurring during body motion, can also play a determined role, since they can also become signals for motion. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiia (Moskva), 1954 (20): 5. DNLM (ZW1. qS729)]

1080

Berkowitz, L. 1952a
INFORMAL NORMS AND WILLINGNESS TO FLY IN COMBAT CREWS. — Amer. Psychologist, 7 (7): 314-315. 1952 DLC (BF1.A55, v. 7)

This is a condensed version of a report delivered at the 60th annual meeting of the American Psychological Association (September 1-6, 1952, in Washington, D. C.). It is essentially the same as the paper, Berkowitz, L., 1952.

1081

Berkshire, J. R., 1952
and R. W. Highland
THE DEVELOPMENT AND EVALUATION OF PROCEDURES FOR RATING AIR FORCE TECHNICAL TRAINING INSTRUCTORS. — Human Resources Research Center. [Technical Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. TECH 52-2, May 1952. 6 p. (Project no. 507-010-0002). ATI 175538
UNCLASSIFIED

This project was undertaken in order to provide an adequate means for the routine assessment of Air Force technical training instructors. Four kinds of forced-choice rating forms, previously found superior under experimental conditions, were re-evaluated under operational conditions. In addition, a graphic rating scale, tried out earlier on a sample group, was made a part of each rating form. Coefficients are presented of correlations, between the forced-choice portions of the forms, as well as coefficients involving the graphic rating scale common to all forms, and correlation coefficients between Instructor Description forms and rank-order data. Coefficients between forced-choice scores and rankings are found to compare favorably with the results obtained on technical training instructors under similar experimental conditions. Further analysis of the data is being carried out in order to determine if more efficient scoring keys can be developed.

1082

Bernstein, L. 1953
THE RELATION BETWEEN RATE AND DIRECTION OF AIR-FLOW AND THE VISCOUS HINDRANCE TO LUNG VENTILATION. [Abstract] — Jour. Physiol. (London), 119 (4): 15P. 1953. DLC (QP1.J75, v. 119)

Observations were made on anesthetized, curarized rabbits under artificial respiration (urethane anesthesia plus D-tubocurarine chloride 0.5 mg./kg. body weight). The lungs were ventilated for short periods in a closed circuit by means of a pump delivering a "sine wave" air flow. The air flow and intratracheal pressure were recorded electrically. At low tidal air volumes the intratracheal pressure curve was nearly a true sine wave. As the dial air was increased the pressure curve became progressively less sinusoidal, the phase of falling pressure becoming of shorter duration than the rising phase. This suggests that the relation of the intratracheal pressure to the rate of air-flow is a non-linear one, and that, except at low rates of flow, the viscous component of hindrance is greater for air leaving than for air entering the lungs. This non-linearity is present when the thoracic cage is opened and widely resected. It is therefore not due to the weight or to the tissue viscosity of the thoracic cage. It is not clear whether it is due to non-uniform lung tissue

viscosity or to non-uniform gas hindrance in the respiratory passages. (From the abstract)

1083

Berredo, J. B. de 1953
[THE NATIONAL PROTEIN PROBLEM AND ALIMENTATION IN AVIATION] O problema protéico nacional e a alimentaçao na aeronautics. — Revista médica da aeronautica (Rio de Janeiro), 5 (1): 171-178. 1953. In Portuguese.
DNLM (W1. RE609, v. 5)

Nutritional requirements in general and the availability of protein and its utilization in Brazilian aviation are discussed. Protein in the Air Force is consumed primarily in meat and, to a lesser degree, in dairy products. To make up for the lack of sufficient protein intake, it is necessary to obtain products which have substantial nutritive value, are easily accessible, and not too expensive. Soybeans and peanuts seem to meet these requirements and, in addition, are easy to digest and rich in amino acids. The utilization of these products in the Air Force is most desirable, and it is hoped that they will help to defeat malnutrition in Brazil.

1084

Berrien, F. K., 1953
and J. H. Hill
INSTRUCTOR PILOT PREDICTIONS OF STUDENT ACCIDENTS. — Aug. 1953. iv+15 p. Institute for Research in Human Relations, Philadelphia, Pa. (Contract AF 18(600)-137); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum no. 38. AD 20 799 UNCLASSIFIED

This report covers a preliminary survey of 58 instructor pilots located at seven Air Training Command bases. They were interviewed to determine whether, in their experience, they had expected certain of their students to have accidents, and whether their expectations had actually been borne out by subsequent events. Results indicate that between 30 and 40 percent of student accidents were "predicted" by instructors at Basic and Advanced single engine jet bases. It is recommended that follow-up in-service research study be initiated to determine whether pilots who are brought before Flying Evaluation Boards and subsequently reinstated on flying status are more likely to have accidents than are pilots who do not appear before Flying Evaluation Boards. (Authors' abstract)

1085

Berrien, F. K., 1953a
and H. Sammons
A STUDY OF CHECK-OUT PROCEDURE IN JET AIRCRAFT. — Institute for Research in Human Relations, Philadelphia, Pa. (Contract AF 18(600)-137); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Report no. 40, Aug. 1953. v+43 p. AD 17 727
PB 113188

An investigation was made of the relationship of check-out procedures to accident frequency. The members of 19 squadrons in transition and combat training bases were observed and interviewed. Uniformity was noted among squadrons in regard to the pattern of topics and phases covered in a check-out; variations were found in briefing, demonstration, quizzing, chase piloting or radio monitoring, etc. These variations were a matter of instructor pilot's preference rather than squadron policy. Some check-out methods provided new information rather than a test of the pilot's knowledge and skill. Observations of four squadrons showed that the higher the rating a squadron received in thoroughness of check-out and in conformity with accepted training principles, the fewer accidents it experienced that could be attributed to inadequate instruction or check-out. However, no significant statistical relationship was established between thoroughness of check-out procedures and accident frequency among 14 squadrons in the Air Defense Command. (AD abstract)

1086

Bevan, W., 1953
and W. F. Dukes
COLOR AS A VARIABLE IN THE JUDGMENT OF SIZE. — Amer. Jour. Psychol., 66 (2): 283-288. 1953. DLC (BF1. A5, v. 66)

Sixteen college students in a relatively 'natural' setting selected from a series of 14 neutral gray reference cards those judged equal in area to 16 test cards of various sizes and colors. Statistical evaluation of ratios of judged area to actual area revealed reliable errors of overestimation, comparable in magnitude, for the red and yellow cards, no error for blue or green. The influence of a particular stimulus-dimension on a specific 'non-parallel' (in the sense that physical extension is correlated with psychological extensity) aspect of the perceptual response is thus considered demonstrated under conditions approximating those of ordinary experience. Subsidiary to this, errors of estimation were found to vary with size of stimulus-card. Interpretation was framed in terms of response range defined by the reference series and the position of the various stimulus-objects within this range. (Authors' summary and conclusions)

1087

Beverly, R. F. 1952
A MEASURE OF RADAR SCOPE INTERPRETATION ABILITY RSI TEST #1. — Human Resources Research Center, Lackland Air Force Base, Tex. Research Note no. AO 52-9, Dec. 1952. 19 p. (Proj. no. 506-006-0002). AD 7956
UNCLASSIFIED

A multiple-choice paper-and-pencil test was developed to measure the ability to interpret navigational radarscope information as presented on O-15 scope photographs. The Kuder-Richardson estimate of the reliability of the Radar Scope Interpretation (RSI) Test No. 1 was 0.75; item selection and item improvement were recommended as

a means for bettering the coefficient. A correlation of 0.35 was obtained between the accuracy scores of 48 subjects on two check missions and the RSI Test scores. A specific proposal is made for a standardized measure of performance in the air. (AD abstract)

1088

Bietti, G. 1953
EFFECTS OF EXPERIMENTALLY DECREASED OR INCREASED OXYGEN SUPPLY IN SOME OPHTHALMIC DISEASES. — A.M.A. Arch. Ophthalmol. 49 (5): 491-513. 1953.
DLC (RE1.A62, v. 49)

After a review of the effects of oxygen deficiency on the visual functions of the normal eye, the results of personal investigations performed by reducing the oxygen supply to the visual apparatus in several morbid conditions of the eye are reported.

By having the subject breathe an oxygen-poor mixture or by placing him in a depression chamber, some visual deficiencies, either signs of an initial or of an apparently cured lesion, may be discovered: enlargement of the blind spot in early glaucoma; appearance of a central scotoma and marked decrease of visual acuity; reduction in the limits of the visual fields in certain neuroretinal diseases; occurrence of ignored hemianopsia in disorders of the intracranial optic pathways; severe impairment of the audiometric response.

On the other hand, an increase of the oxygen supply, mainly by inhalation of oxygen at atmospheric pressure, produces a reduction, or even disappearance, of scotomatous areas of the visual field, as well as improvement in the impaired visual functions. (From the author's summary)

1089

Bietti, G. B., 1953a
and P. F. Ferraris de Gaspare
(ON THE VALUE OF ANGIOSCOTOMETRY AND ARTIFICIAL PHYSIOLOGICAL SCOTOMETRY (ACCORDING TO GOLDMANN) AS A TEST OF VISUAL RESISTANCE IN ANOXIA) Sul valore dell' angioscotometria e della scotometria fisiologica artificiale (sec. Goldmann) come "test" per la resistenza visiva in anossia. — Rivista di medicina aeronautica (Roma), 16 (4): 482-501. 1953. In Italian, with English, French, Spanish, and German summaries (p. 500-501).
DLC (TL555.A1R5, v. 16)

Previous experiments (cf. Brognoli, C., 1952; and Bietti, G. B., 1953) have shown that in a majority of subjects tested a direct relationship exists between extent of angioscotoma and degree of anoxia. However, irregularities of the results have made the procedure unreliable in measuring neurophysiological retinal reactions, particularly at modest degrees of anoxia. — In this study, the authors tested 16 subjects breathing air mixtures containing 14.5%, 10.2%, and 5.3% oxygen for both angioscotoma and the Goldmann scotoma (skiascotoma). The Goldmann scotoma is artificially induced by light absorption of the projected test image within a small area on a bilaterally illuminated test screen. The Goldmann skotoma always underwent enlargement with progressing anoxia. It is, therefore, recommended as a more accurate method of determining impairment of the visual neurones by oxygen deficiency than classical angioscotometry.

1090

Bilodeau, E. A. 1952f
SOME EFFECTS OF VARIOUS DEGREES OF SUPPLEMENTAL INFORMATION GIVEN AT TWO LEVELS OF PRACTICE UPON THE ACQUISITION OF A COMPLEX MOTOR SKILL. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 52-15, April 1952. vi+18 p. (Project no. 509-020-0007).
TIP U24029 PB 107346

The Pedestal Sight Manipulation Test (CM824B) was used in an experiment designed to evaluate the effect of knowledge of results on performance level. The task was to track, range, and fire at a moving target plane. A red filter lit up the target whenever the sighting was properly adjusted. The 60 subjects were divided into 5 groups: (1) all trials without the filter; (2) 5 trials without the filter, 20 filter trials alternating with 19 nonfilter trials, and then 16 trials without the filter; (3) 40 trials with the filter followed by 16 without; (4) 40 trials without the filter followed by 16 trials on which the filter was used alternately; and (5) 40 trials without the filter followed by 16 with. The range scores of the groups using the filter were higher but fell to the level of the control group when the filter was removed. The azimuth and elevation scores were not affected. The results indicated that knowledge of results aided the ranging scores, but only as long as the filter was present. (AD abstract)

1091

Bilodeau, E. A. 1952g
SOME EFFECTS OF VARIOUS DEGREES OF SUPPLEMENTAL INFORMATION GIVEN AT TWO LEVELS OF PRACTICE UPON THE AQUISITION OF A COMPLEX MOTOR SKILL. — Amer. Psychologist, 7 (7): 261-262. 1952.
DLC (BF1.A55, v. 7)

This abstract of an address delivered at the 60th Annual Meeting of the American Psychological Association, Washington, D. C., September 1-6, 1952, is a condensation of the report, Bilodeau, E. A., 1952f.

1092

Bilodeau, E. A. 1952h
PERFORMANCE DECREMENT IN A SIMPLE MOTOR TASK BEFORE AND AFTER A SINGLE REST. — Jour. Exper. Psychol., 43 (5): 381-390. 1952. DLC (BF1.J6, v. 43)

Two groups of female college students performed a competitive motor task which consisted in lifting differently weighted table-tennis balls from a basket and dropping them through a chute. Scores were taken by an electrical counter, which recorded the passage of each ball. A practice period of variable duration preceded the exercise,

and there were rest periods between exercises. It was found that the duration of the initial practice period had no bearing on the mean scores. A relationship was established between length of rest periods and degree of spontaneous recovery. The scores of the preliminary practice period and of the final performance were reversely proportional to the work loading (weight of balls). The decrements in scores after the rest periods increased progressively.

1093

Bilodeau, E. A., 1953
and J. H. Rosenbach
ACQUISITION OF RESPONSE PROFICIENCY AS A FUNCTION OF ROUNDING ERROR IN INFORMATIVE FEEDBACK. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-21, July 1953. iii+11 p. (Project no. 509-020-0007). AD 19 465 PB 124083

For Trial 1, subjects were instructed to turn a micrometer knob 360 degrees. In an effor to reduce the response error on subsequent trials a score concerning the accuracy of the response was reported. The accuracy with which the score was reported to the subject was, however, the experimental variable. The experimenter systematically varied reported-score accuracy from group to group by reference to a schedule of rounding rules. After Trial 1, the subject was asked on succeeding trials to achieve a certain reported score much larger than the one just received. — After considering the response range and the mean error associated with turning a knob, it was fairly evident that little advantage was taken of differing degrees of accuracy in response information. The present experiment helps to define the limits over which the learner is insensitive to the magnitude of the error contained in feedback information. (From the authors' summary)

1094

Bilodeau, E. A. 1953a
THE EFFECTS OF FORCE VARIATIONS BEFORE REST ON RATE OF RESPONDING AFTER REST. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-26, Aug. 1953. iv+13 p. (Project no. 509-020-0002). AD 19 466 PB 112305

The rate of response (revolutions/20 seconds) of 320 airmen on a manual cranking task was measured after an initial practice load of "0" (0.0078 to 0.0285 horsepower, depending on rate of cranking) or "4" (0.0188 to 0.0745 horsepower) and a rest interval of 30 seconds or 4 minutes. The force of the initial practice load did not significantly affect the rate of response made at force levels of 0 or 4 after the 30-second rest period. After the 4-minute rest period the rate was significantly affected; the group with the greater pre-rest load (4) responded more slowly than the group with the lesser pre-rest load (0). (AD abstract)

1095

Bilodeau, E. A. 1953b
SPEED OF ACQUIRING A SIMPLE MOTOR RESPONSE AS A FUNCTION OF THE SYSTEMATIC TRANSFORMATION OF THE KNOWLEDGE OF RESULTS. — Amer. Jour. Psychol., 66 (3): 409-420. 1953. DLC (BF1.A5, v. 66)

Same as Bilodeau, E. A., 1952b.

1096

Bilodeau, I. M., 1952
and E. A. Bilodeau
DECREMENT AND RECOVERY FROM DECREMENT IN A SIMPLE WORK TASK WITH VARIATION IN FORCE REQUIREMENTS AND DURATION OF A SINGLE REST [Abstract]. — Amer. Psychologist, 7 (7): 261. 1952.
DLC (BF1.A55, v. 7)

Decrement and recovery in relation to rest, as functions of unit-response effort requirements and duration of interpolated rest were investigated. A manual crank was used yielding decrement in cranking rate with continuous practice. The schedule involved: (a) continuous work for 4 minutes; (b) rest of variable duration; and (c) continuous work for 3 minutes with the pre-rest work-load. Revolutions per successive 20-second trials were recorded. The following results were reached: (1) During the pre-rest period, between-load differences in cranking rate were evident in the first trial and were stabilized by the third trial. (2) The difference between the first post-rest trial and the final pre-rest trial was an increasing function of rest, for recovery measured in terms of cranking rate or horsepower conversions. Cranking rate showed no relation to work-load while horsepower recovery increased with increasing work load. And (4) after rest, the between work-load differences in cranking rate (rest constant) remained essentially constant throughout the final 3-minute period. Between-rest comparisons indicated more rapid decrement in cranking rate with increasing rest. All rest groups (work-load constant) appeared to be approaching the same asymptote. (Abstract, modified)

1097

Bindra, D., 1953
and L. Cameron
CHANGES IN EXPERIMENTALLY PRODUCED ANXIETY WITH THE PASSAGE OF TIME: INCUBATION EFFECT. — Jour. Exper. Psychol., 45 (3): 197-203. 1953. DLC (BF1.J6, v. 45)

The purpose of this study was to determine the effect on experimentally produced anxiety (measured by an increase in palmar conductance) of a rest interval, during which the subject remains shielded from the anxiety signal. Eighteen subjects were exposed to a series of experimental signals, once before and once after a rest period of 10 min. The anxiety shown in the trials after the rest period was significantly greater than anxiety in the trials before rest. Discrimination

between the shock and nonshock signals also tended to be better before the rest interval. This increase in anxiety reaction brought about by the interpolated rest interval cannot be attributed either to recovery from adaptation or to local physiological changes. It appears to be a genuine incubation effect, but its exact nature is not clear. (Authors' abstract, modified)

1098

Binet, L., 1952d
and M. V. Strumza
[SYNTHETIC ANTIHISTAMINICS AND DURATION OF RESPIRATORY RESISTANCE TO ANOXIA] Antihistaminiques de synthèse et durée de résistance respiratoire à l'anoxie. — Comptes rendus de la Société de biologie (Paris), 146 (19-20): 1482-1483. 1952. In French. DNLM

Same as the paper, Binet, L., 1952a.

1099

Binet, L., 1952e
and M. V. Strumza
[MECHANISM OF THE CHANGES IN THE DURATION OF RESISTANCE TO ANOXEMIA AFTER ADMINISTRATION OF CERTAIN ANTIHISTAMINICS] Mécanisme des variations de la durée de résistance a l'anoxémie après certains antihistaminiques. — Comptes rendus de la Société de biologie. (Paris), 146 (19-20): 1483-1485. 1952. In French. DLC (QP1.S7, v. 146)

Administration of antihistaminics modifies the reactions of experimental animals exposed to severe anoxia. Extension of resistance observed during inhalation of pure nitrogen under the effect of certain antihistaminics can be explained by the fact that pulmonary ventilation is reduced. On the other hand, shortening of the duration of resistance after administration of certain antihistaminics in a chloralized dog, breathing an atmosphere of 2% oxygen, is explained as follows: during anoxia a hypertensive reaction is usually replaced, or rapidly followed when present, by a pronounced decrease in arterial pressure at the onset of apnea. This absence of anoxic hypertension reaction in the period preceding apnea reduces the conveyance of O_2 to the tissues and especially to the central nervous system. In chloralized animals, exposed to the inhalation of pure N_2, an arterial hypotension develops as well as during 2.5% O_2 inhalation, but its appearance coincides with the phase of inversion of gaseous exchange through the alveolar membrane, which delays its effect. Therefore, the slight reduction in pulmonary ventilation caused by administration of antihistaminics prolongs the duration of respiratory activity in pure N_2, by favoring the retention of oxygen in the body, while inhalation of 2.5% O_2 has the opposite effect, as the break in arterial tension prevents the conveyance of oxygen to the respiratory centers.

1100

Binet, L., 1953
M. [V.] Strumza, and F. Coriat
[RESUMPTION OF RESPIRATION AFTER VOLUNTARY APNEA] Le déclenchement de la respiration après apnée volontaire. — Comptes rendus de la Société de biologie (Paris), 147 (7-8): 599-600. 1953. In French. DLC (QP1.S7, v. 147)

The duration of voluntary apnea and the composition of alveolar air before and immediately after the suspension of breathing was determined in different phases of the respiratory cycle, which was either preceded by hyperventilation with pure oxygen or by breathing ordinary atmosphere. Hypoxia can easily be prevented and voluntary apnea prolonged by breathing pure oxygen prior to apnea. Measurements of alveolar CO_2 content after energetic hyperventilation immediately before apnea have shown a partial CO_2 tension of 21.5 mm. Hg (3%), instead of 40.5 mm. Hg (5.68%) without hyperventilation. At the resumption of respiration, the alveolar CO_2 percentage is constant for any one individual, regardless of the state of pulmonary capacity at the start of apnea (forced or normal expiration or inspiration), or of the duration of apnea, averaging 7.78% CO_2 under preliminary hyperventilation. After hyperventilation, apnea lasts up to a CO_2 content of 8.64%. It is concluded that under non-hypoxic conditions, increased duration of apnea after hyperventilation is due, partly, to the initial decrease in CO_2 in the organism, partly to increased tolerance to a richer CO_2 content. Better tolerance of hypercapnia implies nervous and psychic factors: diminishment of the sensitivity of the central nervous respiratory centers to CO_2; reinforcement of the psychic inhibitory power of respiration; or temporary inhibition of respiratory reflexes of peripheral origin.

1101

Bing, J., 1953
and N. Vinther-Paulsen
EFFECTS OF SEVERE ANOXIA ON THE KIDNEYS OF NORMAL AND DEHYDRATED MICE. — Acta physiologica scandinavica (Stockholm), 27 (4): 337-349. 1953. In English. DNLM

Renal functions were studied in unanesthetized mice during anoxia. In half of the cases, renal blanching was observed when the oxygen content of the air was between 5.5% and 6.5%. At a higher O_2 content, greater variations in the rate of blanching were observed in dehydrated mice than in normal mice. When O_2 was replaced by N_2, the period of renal blanching was of shorter duration. The O_2 content of the air at the time of death varied from animal to animal from 2.5% to 5.1% in normal mice, and from 3.9% to 5.8% in dehydrated mice. There was no correlation between the O_2 content at the time of blanching and the survival time of the individual animals. In the experiments where a continuous flow of 5.7% of O_2 in nitrogen was maintained, the blanching period was of short duration, changing to cyanosis in 1/2 to 3 minutes. Renal blanching also occurred when the animal was frightened.

1102

Bing, J. 1953a
RENAL VASOCONSTRICTION AND RESISTANCE

TO ANOXIA. — Acta physiologica scandinavica (Stockholm), 28 (2-3): 241-243. 1953. In English. DNLM

An investigation was made of the correlation between renal vasoconstriction and anoxia tolerance in unanesthetized nephrectomized and normal mice. Anoxia was produced by placing the animals in bottles and having them breathe pure nitrogen. After twenty minutes of anoxia, the exposed kidneys of normal rats turned pale. The resistance to anoxia proved to be the same in normal and in nephrectomized animals. Therefore, renal vasoconstriction could not be shown to have a protective value against anoxic death.

1103

(Biology of flying) 1953

THE BIOLOGY OF FLYING: A SYMPOSIUM HELD AT THE BRITISH ASSOCIATION MEETING IN BELFAST, SEPTEMBER, 1952. — Aeronautical Research Council (Gt. Brit.). Engineering Physics Subcommittee, London. Report no. E. P. 240, May 21, 1953. 15 p. AD 23 124 UNCLASSIFIED

Also published as: THE BIOLOGY OF FLYING: REPORT OF A SYMPOSIUM. — Advancement of Science (London), 9 (36): 375-387. 1953. DLC (Q41.B812, v. 9)

The papers contained in this report were originally presented before a meeting of the British Association for the Advancement of Science (Belfast, September 4, 1952). They are abstracted separately:

Bergin, K. G., 1953
Hick, W. E., 1953a
Rendel, D. G. A., 1953
Stewart, W. K., 1953

1104

Bitterman, M. E., and J. Krauskopf 1953

SOME DETERMINANTS OF THE THRESHOLD FOR VISUAL FORM. — Sept. 1953. iv+34 p. Univ. of Texas, Austin. (Contract AF 33(616)-63); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-331 (RDO no. 694-41). AD 23 337 UNCLASSIFIED

A diffusion model for visual form perception was derived from the Kohler-Wallach theory of figural after-effects. Implications of the model were tested in experiments designed to measure foveal form and brightness thresholds (for luminous figures briefly exposed in a dark room) in terms of intensity of illumination. Form and brightness thresholds were found to vary inversely with exposure-time and with area. Form thresholds varied also with the magnitude of critical detail. Data on the pre-threshold appearance of selected forms were related to results obtained with a physical diffusion model. Preliminary findings on variations in critical flicker frequency with form and on changes in size at threshold levels of illumination also were reported. (Authors' abstract)

1105

Bjurstedt, H. 1953

INFLUENCE OF THE ABDOMINAL MUSCLE TONE ON THE CIRCULATORY RESPONSE TO POSITIVE PRESSURE BREATHING IN ANESTHETIZED DOGS. — Acta physiologica scandinavica (Stockholm), 29 (2-3): 145-162. 1953. In English. DNLM

The factors contributing to the initial fall and secondary recovery of systemic mean arterial pressure at positive pressure breathing were investigated in the dog under light to moderate sodium pentobarbital anesthesia. Extensive abdominal laparotomy, which removes the mechanical support for the abdominal venous blood reservoir, causes an exaggerated drop in the arterial pressure. Upon application of positive intrapulmonary pressure, the intrathoracic pressure increases in the intact anesthetized dog much more than the intra-abdominal pressure. This is believed to promote the formation of a venous pool in the abdomen, which contributes to the initial arterial pressure drop by reducing the effective blood volume available for circulation. In the subsequent apnea the difference of the intrathoracic and abdominal pressure diminishes, while the lungs remain inflated. As a result, the heart output is assumed to increase again, thereby assisting in the secondary recovery of the arterial pressure. The changes observed in the heart rate do not point to any major importance of the sinus and aortic mechanisms for the secondary recovery of the arterial pressure. Some evidence is presented that the vagi may afford special reflex pathways which control the intrathoracic-abdominal differential pressure and are important for the maintenance of venous return to the heart from the abdomen under increased intrapulmonary pressure. (Author's abstract, modified)

1106

Bjurstedt, H., E. H. Wood, and A. Aström 1953a

CARDIOVASCULAR EFFECTS OF RAISED AIRWAY PRESSURE. — Acta physiologica scandinavica (Stockholm), 29 (2-3): 190-201. 1953. In English. DNLM

An experimental study was made on anesthetised dogs of the influence of intrathoracic pressure upon the arterial pressure response under increased airway pressure during (1) positive-pressure inflation of the lungs, (2) simultaneous positive-pressure inflation of the lungs and the intraperitoneal cavity, and (3) positive-pressure inflation of the abdomen with occlusion of the trachea. The effects have been analysed and compared with the arterial pressure response obtained in a "passive" Valsalva test in conscious men, and also with the cardiovascular effects in the classical Valsalva test. In the experiments (2) and (3), the response of the arterial pressure was similar to that in the classic Valsalva test, i.e., an initial rise of arterial pressure was observed. Positive pressure inflation of the lungs in dogs under sodium pentobarbital anesthesia produced a drop

in the arterial pressure, qualitatively comparable to that seen in the "passive" Valsalva test performed in the non-anesthetised human subjects. The role of the intra-abdominal pressure in regard to the arterial pressure response is further illustrated. Some possible practical situations, on which these observations may have some bearing, are briefly discussed. (Authors' abstract, modified)

1107

Bjurstedt, H. 1953b
[PHYSIOLOGY OF RESPIRATION AT HIGH ALTITUDE] Högtrycksandningens fysiologi. — Meddelanden fran flyg- och navalmedicinska namnden (Stockholm), 2 (4): 22-26. 1953. In Swedish. DNLM (W1.SW387, v. 2)

Pressurized cabins have helped the pilot to function more efficiently at extreme altitudes; however, there is still the possibility of loss of cabin pressure in combat or by mechanical failure, and the oxygen mask must still be ready for instant use. A pressure suit is, in effect, an individualized pressure cabin. A pressurized helmet must be worn to effect counterpressure on the mouth, throat, and ears when oxygen is breathed under a pressure of 30 mm. Hg. Oxygen breathed at a pressure of 50 mm. Hg or higher will rupture the lungs if no pressure vest is worn; the pressure vest or suit, however, will effect ideal counterpressure, and safety is thus achieved. The pressure suit protects also against explosive decompression, if such a hazardous condition should arise. Oxygen breathed at a pressure of 60 mm. Hg for any length of time, even if the pilot is wearing a pressure suit, will eventually cause collapse.

1108

Black, J. W. 1952a
ACCOMPANIMENTS OF WORD INTELLIGIBILITY. — Ohio State Univ. Research Foundation, Columbus. (Contract N6onr-22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 9, Feb. 21, 1952. 2+15 p. (Project Report no. NM 001 064.01.09).
TIP U22273 PB 106872

A study was made of the relationships between work intelligibility and aspects of the syllabic pattern, work familiarity, phonetic characteristics of words, and the relative intelligibility of words based on a sample of 3697 words (screened from Thorndike's 1a-10 categories) of medium (20 to 80%) intelligibility. Eighty panels of 9 to 12 listeners each listened to the words in classroom quiet (65 db. of white noise); each panel heard 450 words. Another 80 panels listened to the words in 110 to 118 db. of aircraft-type noise at approx. 2-db. S/N (Signal-Noise ratio). Familiar words and words with many sounds were more accurately identified; 18 sounds enhanced and 7 reduced word recognition. An intelligible word was concluded to be familiar, of more than one syllable with the accent on the second syllable, and composed of combinations of the 18 more intelligible sounds. (AD abstract)

1109

Black, J. W. 1953
MULTIPLE-CHOICE INTELLIGIBILITY TESTS. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 17, Nov. 1, 1953. 20+15 p. (Project Report no. NM 001 064. 01. 17). AD 24 804
PB 113306

Twenty-four equivalent multiple-choice intelligibility tests were constructed. Each test is comprised of 27 single-word items that are read by speakers in sequences of three words. Panels of 11 listeners responded by individually selecting the "heard" word from a group of four possible responses. The error items on the listeners' answer form were derived from the errors that were made by the listeners who heard the test items in a "write-down" testing situation. The 24 tests are not dissimilar in the mean values of the items, nor in the variance of the item-values from list to list. The scores assigned by the tests: (1) have split-half reliability of $\bar{r}$, 0.70-0.80; (2) correlate with earlier multiple-choice tests and PB tests $\bar{r}$, 0.72 and 0.60 respectively; and (3) vary with noise level in the testing room, approximately 1.5% per decibel. The tests appear also to be useful in an environment of "classroom noise", or "free-room" testing. The circumstance for which the tests were designed would allow for testing groups of 12 members, and require a new group with either each testing situation or each pair of such situations. The administration time of the test to a panel of 12 persons is approximately 20 minutes. (Author's summary)

1110

Black, J. W., 1953a
C. J. Atkinson, V. Bragg, S. N. Morrill, and G. C. Tolhurst.
A MEASUREMENT OF THE TEMPORARY EFFECT OF NOISE UPON HEARING. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 18, Nov. 1, 1953. 13+17 p. (Project Report no. NM 001 064. 01. 18). AD 24 803 PB 113307

Pulse-type hearing tests include as a single test item a cluster of "beeps" that listeners identify by counting. A "count" is right or wrong and may contribute to either a pass-fail score or a quantitative score. This principle of testing was employed in the construction of a test for assessing the temporary hearing loss of personnel exposed to controlled levels and spectra of noise for specified times. Pulses of "white" noise and 500-cycle tone were employed in a series of 2-decibel decremental steps: (1) the two types of pulses measure different aspects of the hearing function; (2) five administrations of equivalent forms of the test are required for indoctrination; and (3) a deviation up to 0.7 db. in sound pressure level seems to be "expected" in the preparation and administration of the tape-recorded test and to be evident in diurnal variations of scores. The test was adapted and

coupled with a multiple-choice word-reception test and both were compared with more conventional pulse-type tests. The two conventional tests were found to be more similar to each other than to the present pulse test. The pulse test is more closely related to factors involved in word reception than are the comparison tests. (Authors' summary)

1111

Black, J. W., 1953b
G. C. Tolhurst, and S. N. Morrill
APPLICATIONS OF MULTIPLE-CHOICE SPEECH INTELLIGIBILITY TESTS IN THE EVALUATION AND USE OF VOICE COMMUNICATION EQUIPMENT. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); and Naval School of Aviation Medicine, Pensacola, Fla. Joint Project Report no. 19, Nov. 15, 1953. 20+7 p. (Project Report no. NM 001 064. 01. 19).
AD 24 802 PB 113308

Multiple-choice intelligibility tests were developed during World War II for measuring the results of training in voice communication. The tests have been applied only in situations in which only an occasional measurement was required that employed the same personnel, as before and after classroom instruction. This restriction arose because of the inflexibility of the multiple-choice tests and the restrictions imposed by a single formal printed answer form. More recently, additional forms have been devised and the tests have been used extensively in evaluating equipment and the performance of operators. Summaries of approximately 20 such applications comprise this report. The topics of typical uses include evaluations of visual monitoring of voice level, temporal regularity of voice signals, the relative intelligibility of recorded speech, a relationship between sidetone and "free-room" intelligibility, the components of the tower-to-aircraft radio system, comparisons of alternative headsets and microphones, and bone-conduction masking. A singular utilization of the multiple-choice test is through controlling the separation time of the test items and determining the rapidity with which the test items can be identified through comparison system. (Authors' summary)

1112

Blevins, W. V., 1953
H. Frankel, H. Garren, and F. N. Craig
CONTINUOUS NITROGEN ANALYSIS IN THE MEASUREMENT OF GAS MASK LEAKAGE AND THE RATE OF ELIMINATION OF NITROGEN FROM THE BODY. — Army Chemical Center. Chemical Corps Medical Labs., Md. Research Report no. 216, Sept. 1953. i+21 p. AD 21 049
UNCLASSIFIED

The Nitralyzer, a device with two indicating ranges, was employed to obtain a continuous nitrogen analysis of the expired air of six subjects wearing modified gas masks. While completely submerged in water, the subjects were supplied a mixture of about 1.0% N_2 in 99.0% O_2. During the inhalation of the mixture, the body added a small amount of nitrogen to the expired air, about 0.1% after the first 10 to 15 minutes and 0.04% after 90 minutes. This method permitted continuous recording as compared with spot sampling by the Scholander (chemical) method, although the accuracies of the two methods were both of the order of 1 part/1000. The Nitralyzer method had the advantage of freedom of movement. (AD abstract)

1113

Blockley, W. V. 1953
COMBINED PHYSIOLOGICAL STRESSES. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 61-64. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953.
DLC (TL670. C25, 1953)

A general discussion is presented on the roles of physiological and operational stresses acting separately or together in the efficient and safe operation of aircraft. Physiological stresses may be imposed on man by environmental conditions within the craft. These conditions (cold, oxygen dificiency, reduced barometric pressure, toxic agents, and carbon dioxide) may be controlled, for the most part, by aircraft design features. Emergencies during flight may result, however, from additional stresses caused by positive-pressure breathing, rapid decompression, wind blast, parachute opening shock, extreme cold, and hypoxia. Aircraft operation may cause stress due to heat, acceleration, or psychomotor or emotional factors; but selection, training, and practice may minimize the incidence of operational stresses among flying personnel. --- Reference is made to experiments concerned with human tolerance to hypoxia when combined with light exercise, erect posture, inhalation of carbon monoxide or carbon dioxide, exposure to cold, heat, g-forces, alcohol consumption, or psychomotor tasks following alcohol consumption. The observations tend to confirm the fact that man has the ability to adapt to extreme conditions. The need for further research on the effects of simultaneous stresses on performance, particularly under flight conditions, is apparent.

1114

Blodgett, H. C., 1953
L. A. Jeffres, and B. H. Deatherage
DIRECTIONALITY OF SOUNDS HAVING LARGE INTERAURAL TIME DIFFERENCES [Abstract]. — Amer. Psychologist, 8 (8): 322-323. 1953.
DLC (BF1. A55, v. 8)

The ability of subjects to detect "sidedness" in binaurally presented noise where there is a time delay in the channel to one earphone was tested. In Test I, with the micrometer set for maximum delay, the subject adjusted it, reducing the delay, until the diffuse all-around sound began to appear onesided. Results indicated average delays for 20 randomly presented sounds, 10 from each side, were 9.5 milliseconds for a wide-band noise (106 c.p.s. to 4800 c.p.s) and 7.5 milliseconds for a narrow band centered at 425 c.p.s. The subjects

made 100% correct judgments of direction, showing these values to be well within threshold. In Test II, 20 bursts of noise were recorded on a tape loop, 10 with the adjustable head at one extreme of its travel and 10 at the other, in random order. The subject was asked to indicate whether the sound came from the left or right. By adjusting the micrometer in playback, delays ranged from 2 to 22 milliseconds in 2-millisecond steps. Two methods of presenting the noise were possible here: (a) both the noise and its envelope were delayed equally, and (b) only the noise was delayed. Method I yielded correct responses up to 22 milliseconds because subjects used both the precedence of the envelope and the sidedness of the noise. Method II was sufficiently difficult, with long delays, to yield thresholds. For wide-band noise, the 75% threshold averaged 15 milliseconds. (Authors' abstract, modified)

1115

Blum, R. H., 1953
and J. Nims
TWO CLINICAL USES OF THE BENDER VISUAL-MOTOR GESTALT TEST. — U. S. Armed Forces Med. Jour., 4 (11): 1592-1599. 1953. DLC (RC970.U7, v. 4)

The following two aspects of the Bender Visual-Motor Gestalt test (cf. Bender, L. Visual-Motor Gestalt Test and its clinical use. New York: American Orthopsychiatric Assoc., 1938) were investigated: (1) its usefulness in group testing; and (2) its usefulness in the detection of malingerers posing as mentally ill. Sixty-four Army neuropsychiatric hospital patients were divided into an experimental group tested collectively and a control group retested individually. No significant difference in results were found between individual and group tests. For the purpose of detecting malingerers the test was given to a third group of subjects instructed "to act like... mentally ill when taking the test" and to a control group of neuropsychiatric patients. The possibility to discriminate between true psychiatric cases and malingerers was proven, and some of the characteristic drawing features serving as differential signs are explained.

1116

Bolt, R. H. 1953
THE AIRCRAFT NOISE PROBLEM. — Jour. Acoust. Soc. America, 25 (3): 363-366. 1953. DLC (QC221.A4, v. 25)

Aircraft noise presents a system problem which to date has been attacked mainly at the level of individual components. The system includes: (a) aircraft as noise sources; (b) atmosphere and terrain as influences on sound propagation; (c) people, under several classes and conditions, as responders to noise; (d) physical components for controlling noise; (e) operating procedures for reducing noise exposure in communities; (f) public relations; (g) aviation planning policies and economics; and (h) many organizations concerned with characteristics and consequences of aircraft noise. The nature of these components is reviewed in a general way, with emphasis on their inherent interrelations. (Author's summary)

1117

Bond, H. J., 1953
and J. T. Parker
THE EFFECT OF ALTERNATING MESSAGES BETWEEN CHANNELS IN SIMULTANEOUS LISTENING [Abstract]. — Amer. Psychologist, 8 (8): 323. 1953. DLC (BF1.A55, v. 8)

The effects of alternating relevant and irrelevant messages transmitted simultaneously between two voice channels were investigated in enlisted men who listened to a series of 32 exercises prepared on magnetic tape. The exercises consisted of two 60-word messages spoken simultaneously through one loud speaker by a male and a female voice. Messages were random sequences of eight monosyllabic letters or numerals. Four levels of alternation frequency—0, 5, 10, and 20 alternations per exercise—were combined with two transmission rates, 30 and 60 words per minute. The subjects attempted to write down the words according to instructions either for one of the messages or for a particular voice channel. Each subject performed under all conditions and instructions, the order of which was systematically varied. Alternations produced little effect when attending to voices. Explanation was thought to lie in the distinguishability of voices as compared to that of the meaningless messages. The increase of errors was approximately linear for both transmission rates except that the rate of increase tapered off for the fast rate at the maximum alternation frequency. Three times as many errors occurred with the fast as with the slow message rates and twice as many occurred for message as for channel instructions. (Authors' abstract, condensed)

1118

Bornschein, H., 1953
and F. Krejci
[POSSIBILITIES AND LIMITATIONS OF A BIO-ELECTRICAL TEST OF COCHLEAR FUNCTIONS] Möglichkeiten und Grenzen einer bioelektrischen Funktionsprüfung der Schnecke. — Monatschrift für Ohrenheilkunde und Laryngo-Rhinologie (Berlin and Wien), 87 (4): 268-274. 1953. In German. DNLM

A critical discussion is presented as to how far measurements of cochlear microphonics can produce quantitative indications concerning a subject's hearing capacity. Several existing methods of determining the loss of cochlear potential are discussed. It is concluded that, if the expected loss of potential is not too great, identification of hearing loss and potential loss seem possible by means of direct measurement of the altered amplitude. At more radical potential losses, however, a quantitative correspondence is not to be expected. Mention is made of earlier findings that anoxia causes a breakdown of cochlear potential diminishing all the amplitudes, regardless of the intensity of stimulation (Monatsschrift für Ohrenheilkunde und Laryngo-Rhinologie, 83: 190-196. 1949).

1119

Boucher, H., 1953
J. Bastien, F. Raguenes, and P. Talec
[PULMONARY BLAST INJURY FROM EXPOSURE TO THE BLAST OF A TURBOJET ENGINE] Blast injury pulmonaire per exposition au souffle d'un turbo-réacteur. — Presse médicale (Paris), 61 (83): 1804-1805. 1953. In French. DNLM

A soldier passing by a turbojet engine, at the moment when it was tried out at full blast, was whirled around and suffered superficial contusions, but was able to resume his work. However, on the days following this incident he was very tired, he shivered, and felt thoracic discomfort; on the 6th day, a routine radiological examination of the lungs revealed fine, round shadows on the lung fringes, suggesting blast injury. Blood analysis indicated slight anemia and a strongly accelerated sedimentation rate. Rest and administration of tonics restored the subject in 4 weeks; however, strong lymphomononucleosis persisted. The pulmonary lesions appeared to be caused by a strong compression wave, immediately followed by strong negative pressure. For treatment, immediate immobilization of the patient and abstention from liquids, which would increase the risk of edema, are recommended. Oxygen therapy and morphine administration have been found helpful. The patient should be kept at rest, and transportation should be avoided to prevent secondary hemorrhages. Out of 200 cases observed, all those who survived the first hour after the injury could be saved.

1120

Bouman, M. A. 1952
THE VISIBILITY OF BLACK OBJECTS AGAINST AN ILLUMINATED BACKGROUND. — Jour. Optical Soc. Amer., 42 (8): 525-528. 1952. DLC (QC350.O6, v. 42)

In this series of experiments, the observer was dark-adapted for a period of 1/2 hour before each experimental session. Next, the eye being tested was fixed with the aid of a mouth mounting piece held between the teeth of the observer. A red fixation point was observed by the eye to which the test flashes were presented. Peripheral rod vision 7° nasal from the fovea was measured. Durations, shapes, and sizes of flashes as well as the visual angle of the test spot (the red fixation point), the flashtime, and the contrast threshold were determined and utilized for calculating the number of quanta necessary to perceive a negative flash.

1121

Bouman, M. A. 1952a
PERIPHERAL CONTRAST THRESHOLDS FOR VARIOUS AND DIFFERENT WAVELENGTHS FOR ADAPTING FIELD AND TEST STIMULUS. — Jour. Optical Soc. Amer., 42 (11): 820-831. 1952. DLC (QC350.O6, v. 42)

Using red light for the background and the test spot, and red light for the background and green for the test spot, a circular field of light was projected on the center of an illuminated, circular background. While the intensities of both the background and the test spot were varied, and the test light was flashed for differing time intervals, data were obtained which gave a contrast threshold value as a function of the various durations and sizes of the test flash. It was proved that the perception of red light was dominant over the stimulation of the rod system by the background light (with the exception of very high brightnesses of green background). Corresponding contrast thresholds for both the left and right eyes were determined by reversing the color combinations as each eye was individually tested.

1122

Bouman, M. A. 1952b
MECHANISMS IN PERIPHERAL DARK ADAPTATION. — Jour. Optical Soc. Amer., 42 (12): 941-950. 1952. DLC (QC350.O6, v. 42)

Measurements are presented of the absolute thresholds for red and green test flashes at various times during a 0.5-sec. interruption of a red and green adapting field occurring each 3 sec., under variation of the size $\underline{d}$ of the test spot between 4'-420' and the brightness $\bar{n}$ of the adapting field. The flashes were projected so that the adapting circular background had its center 7° nasal from the fovea. From these measurements nervous and photochemical components in adaptation are detected with the aid of speculations on the validity of quanta-explanations for visual functions. The dependence of the absorption power of the photochemical substances on the adapting brightness which we deduced from the reported data, agree with the steady-state equation in photochemical theories. With increasing brightness of the adapting field for green test flashes, Ricco's region in the curve representing the absolute threshold as a function of $\underline{d}$ diminishes, whereas the minimal necessary number of quanta that is absorbed in the receptors is such that they contribute to the light perception increases. (Author's abstract, modified.)

1123

Bouman, M. A., 1952c
and G. van den Brink
ON NIGHT MYOPIA. — Ophthalmologica (Basel), 123 (2): 100-113. 1952. In English. DNLM

Night myopia was studied separately for the left and right eye with the aid of telescope settings, using various test objects, brightnesses, pupil sizes, and directions of fixation. Measurements of visual acuity as a function of ocular settings at various parameters are included. It is shown that night myopia is partly due to spherical aberration. (Authors' abstract, modified)

1124

Bouman, M. A. 1953
VISUAL THRESHOLDS FOR LINE-SHAPED TARGETS. — Jour. Optical Soc., Amer., 43 (3): 209-211. 1953. DLC (QC350.O6, v. 43)

Measurements of absolute and contrast threshold values, 7° nasal from the fovea for 6500 and 5250 Å, for line-shaped targets (2' in width, length between 2'-256', and time of observation between 0.02-1 seconds) are presented. The absolute thresholds agree with what was to be expected from the two-quanta theory. Predictions for the behavior of the contrast thresholds for line-shaped sources are made which are also based on the quanta theories. (From the author's abstract)

1125

Bouman, M. A., and G. van den Brink 1953a
ABSOLUTE THRESHOLDS FOR MOVING POINT SOURCES. — Jour. Optical Soc. Amer., 43 (10): 895-898. 1953. DLC (QC350.O6, v. 43)

The theoretical treatment of absolute and contrast thresholds for moving point sources is presented. The thresholds are tested as functions of the velocity v and observation time t on the assumption that, under all conditions for minimum perceptibility p, quanta must be effectively absorbed in the retina within γ seconds the δ minutes of arc; within γ and δ the integrate capacity in time and space of the sense organ is complete. p, δ, and γ depend on the particular condition of colors of the light used, state of adaptation, place of the retina, and the like. — For absolute thresholds in the dark-adapted eye, p = 2 quanta independently of the color of the test stimulus. The behavior of experimental data for absolute thresholds of green and red moving point sources is also in agreement with the dependences deduced from theory when p = 2. The data were obtained at retinal positions 7° nasal to the fovea in the dark-adapted right eye. (Authors' abstract)

1126

Bouman, M. A., and J. ten Doesschate 1953b
NERVOUS AND PHOTOCHEMICAL COMPONENTS IN VISUAL ADAPTATION. — Ophthalmologica (Basel), 126 (4): 222-239. 1953. In English. DNLM

A method was investigated by which the photochemical and possible nervous component of retinal adaptation can be detected. The influence of the magnitude of stimulation on the perception of light flashes was determined. Two quanta are absorbed by the retinal receptors in order to elicit a luminous impression in the dark-adapted eye. This number increases with the degree of light adaptation. This fact points to the existence of a nervous component in retinal adaptation which supplements the photochemical mechanism. (Authors' abstract, modified)

1127

Bourdon, J. R., and Lesage 1953
[SOME CLINICAL FINDINGS CONCERNING THE EFFECTS OF SOUNDS, VIBRATIONS, ULTRASONICS ON PERSONNEL EXPOSED TO THEIR ACTION] Quelques constatations cliniques concernant les effets des sons, vibrations, ultra-sons sur les personnels exposés à leur action. — Médecine aéronautique (Paris), 8 (3): 185-200. 1953. In French. DLC (TL555.M394, v. 8)

Clinical and laboratory tests carried out on 51 subjects working at test benches, and exposed to extreme noise generated by pulse-jets, ram-jets, and supersonic blast engines are analyzed. The following results were obtained: (1) In 30% of the cases examined an abnormal fatigue (not justified by clinical test data) was noted; however, fatigue was considered pathological only if it prevailed for over 48 hours and was accompanied by insomnia. (2) In 75% of the cases the effects of sounds, vibrations, and ultrasonics were well tolerated. (3) In 20% of the subjects examined, clinical and laboratory tests revealed pathological changes. However, with the exception of a few cases, factors extraneous to working conditions were considered responsible for these findings. (4) In 5% of the cases a true intolerance to excessive noise seemed to develop in new young employees not yet accustomed to the auditory environment around test benches. This intolerance manifested itself in intense fatigue, sometimes a sudden but mostly progressive loss of weight, and anemia. And (5) a marked acceleration of the sedimentation rate extending often beyond the time when clinical disorders have disappeared. Intolerance to excessive noise or a transitory aggravation of a concomitant pathological condition may be the cause of this disorder of the hemopoietic system.

1128

Bowen, H. M. 1952b
SIGNAL VISIBILITY ON A B-SCAN RADAR DISPLAY: STUDY OF NOISE BRIGHTNESS AND NOISE PATTERN. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 782, Feb. 1952. 8+2 p. AD 75 036 UNCLASSIFIED

This paper describes an hypothesis and an experiment which endeavor to define the effect of video noise on signal detection on radar displays. From psycho-physical data (supported by some work on radar screens) it is postulated that brightening the screen tends to increase signal detection. From inferences drawn on the one hand from Gestalt psychology and on the other hand from Information Theory, it is postulated that where the video noise background becomes phenomenally heterogeneous signal detection is impaired. The results of an experiment are reported and interpreted to show that the hypothesis is not contradicted though not entirely confirmed. The chief difficulty hindering positive confirmation of the hypothesis is the lack of adequate measures of display features. An incidental finding is that it is best to have a Grid Bias on a cathode ray tube set at, or slightly below, the Video cut-off point. (Author's summary)

1129

Bowen, J. H. 1952
REVIEW OF THE LITERATURE CONCERNED WITH PURSUIT AND TRACKING BEHAVIOR. —

Univ. of Maryland, College Park. Technical Report no. 4 on Indicators of Behavior Decrement, March 7, 1952. 21 p. (Contract DA 49-007-MD-222). AD 31 304 UNCLASSIFIED

Pursuit performance has been shown to be a function of a number of factors such as: hand preference, sex, rate of operation of manipulanda, task-body orientation, amount of previous practice, time since last practice period, motivation, knowledge of results, friction of operation of manipulanda, target size, initial level of performance, activities since last practice, stress in surround, magnitude of displacement of target, dimensionality of target-manipulanda relations, and technique of scoring. A review of the pertinent literature shows that the relationship between a variable such as strenuous work and tracking performance is inconsistent. It is suggested that total time on target may be too gross a measure to be sensitive to changes brought about by systemic fatigue, and, for this reason, the use of several dependent variables of a more "molecular" nature is recommended. A theoretical analysis is presented which supports the need for a subdivision of dependent variables and, in addition, presents the rationale for continued use of pursuit performance as a potential indicator of decrement due to systemic fatigue. (Author's summary, modified)

79 references.

1130

Bowen, J. H., 1952a
T. A. Hussman, and W. A. Lybrand
A REVIEW OF THE LITERATURE ON INDUCED SYSTEMIC FATIGUE. — Univ. of Maryland, College Park. Technical Report no. 7 on Indicators of Behavior Decrement, March 18, 1952. 13 p. (Contract DA-49-007-MD-222). AD 31 307 UNCLASSIFIED

The definitions by numerous authors of the concept of "fatigue", along physiological or psychological lines, or in terms of work decrement, are briefly reviewed. The methods used to induce fatigue may be classified according to the following general categories: (1) sleep deprivation; (2) length of work periods; (3) the ergographic techniques (direct graphic recording of muscular fatigue); (4) psychomotor tasks; and (5) physical-exercise tasks. A survey of the pertinent literature induces the authors of this paper to recommend sleep deprivation and physical exertion methods as the most practicable. The variables involved may be applied either separately or interacting with each other, or additional variables, such as anxiety, may be added. In any event, it is mandatory that all additional variables be controlled to avoid misleading side effects on the main determining variables. Ergographic and normal workday techniques are not recommended, the former being too limited in applicability, the latter offering little opportunity for adequate experimental control.

94 references.

1131

Bowen, J. H. 1953
THE RELATIONSHIP BETWEEN STRENUOUS WORK AND SLEEP PRIVATION AND PURSUIT TRACKING LATENCY. — University of Maryland, College Park. Technical Report no. 13 on Indicators of Behavior Decrement. [1953]. 20 p. (Contract DA-49-007-MD-222). AD 31 290 UNCLASSIFIED

An experiment was undertaken to determine the effects of strenuous work and sleep privation upon pursuit tracking latency. 48 undergraduate students were divided into two groups, one of which was deprived of sleep and the other slept normally for one night. These two groups were further subdivided into three groups: one group did not ride a stationary bicycle, one group rode for five minutes, and one group rode for ten minutes. The following conclusions seem justified: (a) loss of one night's sleep significantly lengthens linear pursuit tracking latency, (b) the strenuous work used showed no effect upon the latency dependent variable, and there was no interaction between strenuous work and sleep privation variables, and (c) pursuit tracking latency appears to be a decay function of the duration of the tracking path deviation. (From the author's summary)

1132

Bowman, N. J. 1953
THE FOOD AND ATMOSPHERIC CONTROL PROBLEM ON SPACE VESSELS. I. CHEMICAL PURIFICATION OF AIR. — Jour. Brit. Interplanetary Soc., 12: 118-123. 1953. DLC (TL790. A1B7, v. 12)

A small refrigeration unit will successfully remove water from the air of a closed environment, such as that of a space vessel. The removal of CO_2 by means of refrigeration and compression, however, would require that large quantities of air be processed in order to hold the CO_2 level below 0.2%. For long space flights, calcium oxide should be quite efficient in removing CO_2 and water. This reagent can be regenerated by heating the carbonate formed. For shorter trips, lithium oxide, which is non-regenerative, is recommended for the removal of CO_2 and water.

1133

Bowman, N. J. 1953a
THE FOOD AND ATMOSPHERIC CONTROL PROBLEM IN SPACE VESSELS. II. THE USE OF ALGAE FOR FOOD AND ATMOSPHERE CONTROL. — Jour. Brit. Interplanetary Soc., 12: 159-167. 1953. DLC (TL790. A1B7, v. 12)

Human waste products in a closed environment, such as would be encountered in a space vessel, could be converted to edible proteins and fats by the use of algae. At the same time oxygen would be liberated as the algae utilized the CO_2 exhaled by the men aboard ship. Thus, in theory, a completely closed cycle for food and atmosphere is possible. A trip of 5-month duration would be necessary in order that this scheme function more effectively than the alternative of carrying dehydrated food and liquid oxygen. This is because of the weight of algae and equipment. However, it is

expected that advances in the technology of algae growth will shortly cut this critical time limit to 1 month.

1134

Boyle, D. J., 1953
and W. V. Hagin
THE LIGHT PLANE AS A PRE-PRIMARY SELECTION AND TRAINING DEVICE. I. ANALYSIS OF OPERATIONAL DATA. — Human Resources Research Center. Pilot Training Research Lab., Goodfellow Air Force Base, Tex. Technical Report no. 53-33, Oct. 1953. vi+61 p. (Project no. 508-016-0004). AD 21 742 UNCLASSIFIED

An experimental evaluation was made of operational data to ascertain whether light plane training would (1) provide valid selection data on which to base differential prediction of success or failure in subsequent flying training above that accomplished with existing procedures, and (2) improve student pilot proficiency during primary training. The following major findings are suggestive of the value of light plane training: (1) Light plane training helped students over the T-6 solo hurdle; 90.3% of the light plane students soloed as compared with 73.3% of the control students. The light plane students required, on the average, 4 hours less T-6 instruction prior to solo than did the control students. (2) Significantly more light plane students (86.7% as compared with 62.5% of the control students) were successful in completing primary pilot training. (3) Light plane students had markedly fewer accidents during primary training than did members of the control group. (AD abstract)

1135

Boynton, R. M. 1952
LIGHT ADAPTATION IN THE HUMAN EYE AS MEASURED BY THE ELECTRORETINOGRAM [Abstract]. — Amer. Psychologist, 7 (7): 254. 1952. DLC (BF1.A55, v. 7)

Tests were carried out on three subjects with normal vision to investigate the retinal basis of the time course and spatial locus of light adaptation. After 45 minutes of preliminary dark adaptation, test flashes were delivered at various intervals after the onset of an adapting stimulus; responses to both adaptation and onset and test flash were recorded. The adapting stimulus was varied in wave length, area, and intensity; test flashes of small area (3′ to 7′) and various intensities were employed. The following were the major findings: (1) The sensitivity of the retina decreases considerably within 0.15 second, reaches a minimum within 0.6 second, rises to a maximum after 3 to 5 seconds, and then declines steadily for 2 to 8 minutes. (2) There is a high correlation between the response-producing and adaptive capacities of stimuli, regardless of area or wave length. (3) The time course of light adaptation, measured with the electroretinogram (ERG) parallels certain psychophysical and physiological (optic nerve) data. And (4) the ERG to small stimuli resulted primarily from stray light which stimulates extensive peripheral regions. (Abstract, modified)

1136

Boynton, R. M., 1953
and W. R. Bush
DARK ADAPTATION AND THE INSTANTANEOUS THRESHOLD [Abstract]. — Amer. Psychologist, 8 (8): 324. 1953.
DLC (BF1.A55, v. 8)

The course of dark adaptation was determined during the first fraction of one second. Two beams of light entered the subject's eye so as to be seen as two concentric circles: the larger, subtending a visual angle of 7°, provided an adapting stimulus the smaller, 3.5°, was a test flash of 0.04-second duration. Negative time intervals were also used, meaning that the test flash was sometimes delivered before the offset of the adapting stimulus. Following preadaptation, thresholds for each time in the dark were determined by a descending method of limits, with repeated presentations of the following sequence: (a) adapting light off; (b) test flash delivered after a given time interval; (c) adapting light restored to allow subject to regain steady-state level. Thresholds were thus determined for times ranging from -0.2 to +0.5 second, at the following adapting luminances: 328, 32.8, 3.28, and 0.328 millilambert. The drop in absolute threshold during the first half-second of dark adaptation ranged from nearly two log units for the highest adapting level to about 0.5 log units for the lowest adapting level. The drop began at zero time for the highest level, at 0.02 second at the lowest level. A nearly equal anticipatory rise in the intensity discrimination threshold was observed for negative times at all adapting levels. For the higher luminances, an appreciable portion of the dark-adaptation process is completed within a half-second. (Authors' abstract, modified)

1137

Bramati, C. 1953
(ON THE ACCELERATIONS OF THE HUMAN ORGANISM DURING SOME VOLUNTARY MOVEMENTS, PARTICULARLY ON THEIR RELATIONSHIP TO THE AGE OF THE SUBJECTS) Sulle accelerazioni dell'organismo umano durante alcuni movimenti volontari e particolarmente sui loro rapporti con l'età dei soggetti. — Rivista di medicina aeronautica (Roma), 16 (1): 41-50. 1953. In Italian, with English, French, Spanish, and German summaries (p. 49-50).
DLC (TL555.A1R5, v. 16)

Accelerograms and kymograms were recorded simultaneously in subjects (ranging in age from 19 to 47 years) while performing body-bending exercises. The accelerogram (acceleration in g, plotted against time in 1/10 second) revealed a distinct diphasic pattern corresponding to agonistic and antagonistic muscular activities. With progressing age of the test subjects a distinct decrease of the dimensions of these phases was observed.

1138

Brandão, G. 1953
[PHYSICAL CONDITION OF AVIATION PERSONNEL: ANOXIA AND ACCELERATION] Condicoes fisicas do pessoal de aviação: anoxia e acelerações. — Revista portuguesa de medicina militar (Lisboa), 1 (1): 41-47. 1953. In Portuguese.
DNLM

Criteria for the selection of flying personnel are discussed. The preferable age for flying is between 20 and 28, requirements of height vary with the different countries. To be able to adapt himself to physical hardship the aviator should have a normal body weight, a good pulmonary and cardiac system, healthy abdominal organs, good vision, and perfect hearing. — In the etiology and pathogenesis of anoxia, altitude and exposure time are the decisive factors. The individual anoxia index can be easily determined in the decompression chamber. Between altitudes of 3000 and 5000 m. no difficulty is experienced; from 5000 to 7500 m. sleepiness and loss of consciousness are noted occasionally; and from 7500 to 9000 m. these symptoms set in after two minutes. During night flight at high altitudes the use of oxygen is imperative. At 1200 m. vision is reduced during the night by 5%, and at 5000 m. by 45%. — The effects of acceleration are analyzed. Controlled distribution of the pressure by means of pressure suits provides some degree of protection. No protection is available against negative acceleration causing the rushing of the blood to the brain. The limitations of human tolerance are reached at -4g.

1139

Brecher, G. A. 1952
MECHANISM OF VENOUS FLOW UNDER DIFFERENT DEGREES OF ASPIRATION. — Amer. Jour. Physiol., 169 (2): 423-433. 1952.
DLC (QP1. A5, v. 169)

A study is made of the two controversial views: the 'Classical aspiration theory' of Haller, which states that inspiration increases venous return to the heart, and the 'collapse theory' of Holt and Duomarco, which denies this possibility. Changes in intrathoracic pressure were substituted for by direct aspiration at the peripheral end of the divided superior vena cava in 11 anesthetized open-chest dogs. Two distinctly different stages were observed in the venous outflow when negative pressure was applied at the peripheral end of the vessel. During the first or depleting stage, characterized by a continuous reduction of the vein's filling state, outflow from the vein increased in direct proportion to the pressure gradient, while resistance remained practically constant. The second, or collapsed stage, was only entered after the veins had emptied part of their content and assumed a reduced filling state. The depleting stage lasted more than 10 seconds when negative pressures were applied, corresponding to the range of intrathoracic pressures expected with quiet respiration (-100 mm. H_2O). Thus it is possible that during the depleting stage the extrathoracic veins empty part of their content into the thoracic veins, resulting in a phasic increase of venous return to the heart with inspiration. This mechanism was postulated by the classical aspiration theory. However, after the veins have reached their collapsed stage, as occurs in very deep inspiration, a further flow increase could not be expected. Only during this latter stage the mechanism demanded by the collapse theory can operate. (From the author's summary)

1140

Brecher, G. A., 1952a
and G. Mixter
AUGMENTATION OF VENOUS RETURN BY RESPIRATORY EFFORTS UNDER NORMAL AND ABNORMAL CONDITIONS [Abstract]. — Amer. Jour. Physiol., 171 (3): 710-711. 1952.
DLC (QP1. A5, v. 171)

The controversial hypothesis of J. P. Holt and J. P. Duomarco that collapse of the extrathoracic veins would prevent an increase of venous return could not be confirmed under normal physiological conditions. Return flow to the heart was simultaneously measured in the superior and inferior cavae of anesthetized dogs by introducing two low resistance Pitot type flowmeters into both vessels. After chest closure, flow in both cavae is phasically increased by respiratory movements. In the superior cava this augmentation is exclusively due to thoracic aspiration. In the inferior two forces are involved: thoracic suction and abdominal compression. These forces ordinarily supplement one another, but either one can act separately. In spite of a slight flow reduction during expiration, the effect of respiration consists in a significant net increase of total venous return over that when respiratory efforts are absent. Partial collapse of the extrathoracic veins occurs under normal conditions only during deep inspirations. This collapse prevents further augmentation of flow in both cavae. In the inferior system elevation of abdominal pressure may in addition enhance this tendency toward collapse. However, even in the presence of partial collapse during deep inspirations, flow in both cavae is greater than during the expiratory pause. Flow in both caval systems is significantly reduced by positive pressure artificial respiration. (From the abstract)

1141

Brecher, G. A., 1953
and G. Mixter
EFFECT OF RESPIRATORY MOVEMENTS ON SUPERIOR CAVA FLOW UNDER NORMAL AND ABNORMAL CONDITIONS. — Amer. Jour. Physiol., 172 (2): 457-461. 1953.
DLC (QP1. A5, v. 172)

Blood flow was measured in the superior vena cava of anesthetized dogs with a low-resistance differential flowmeter. Venous return to the heart increased significantly with inspirations due to the depleting of the extrathoracic veins into the chest veins. With Müller's experiment venous return was augmented in the beginning of the in-

spiratory effort, but failed to increase further during the later part of the inspiration when the extrathoracic veins had become depleted and reached their collapsed stage. Even in the presence of the partial peripheral venous collapse, toward the end of inspiration, the flow rate was greater than during the expiratory pause. In spite of a slight flow reduction during expiration, the effect of respiration consisted in a significant net increase of venous return over that when respiratory efforts were absent. The respiratory flow augmentation was reduced by hypovolemia and enhanced by hypervolemia. During artificial respiration in the open as well as closed chest, positive-pressure lung inflation consistently diminished venous return first; changes in arterial pressure followed several heart cycles later. Compared with normal respiration, superior vena cava return to the heart was significantly reduced by intermittent positive pressure respiration in the closed chest. (Authors' summary)

1142

Brecher, G. A. 1953a
VENOUS RETURN DURING INTERMITTENT POSITIVE-NEGATIVE PRESSURE RESPIRATION STUDIED WITH A NEW CATHETER FLOWMETER. — Amer. Jour. Physiol., 174 (2): 299-303. 1953. DLC (QP1.A5, v. 174)

Venous return was recorded with a Pitôt-type differential flowmeter passed as a catheter via jugular vein into the superior vena cava of anesthetized dogs, whose chests remained unopened. Direct measurement of volume flow in the superior cava demonstrated that application of intermittent positive-negative pressure respiration increases venous return significantly over that existing during intermittent positive-atmospheric pressure respiration. (Author's summary)

1143

Breckenridge, C. G., 1953
and H. E. Hoff
ISCHEMIC AND ANOXIC DISSOLUTION OF THE SUPRAMEDULLARY CONTROL OF RESPIRATION. — Amer. Jour. Physiol., 175 (3): 449-457. 1953. DLC (QP1.A5, v. 175)

In some experiments decerebrate rigidity and a decerebrate respiratory pattern fail to appear after midcollicular and midpontine decerebrations. Posture and breathing resemble those of the medullary preparation and apneusis fails to appear on vagotomy. When the basilar artery is ligated close to its origin from the vertebrals, decerebrate rigidity and the decerebrate pattern of breathing also fail to appear, and apneusis does not follow vagotomy. When the decerebrate, vagotomized animal is subjected to progressive anoxia, apneusis first appears, and then gives way in turn to rhythmic breathing before apnea supervenes. By careful exposure to anoxia, apneustic breathing can be abolished, and rhythmic breathing re-established. This breathing is eupneic and non-gasping in character. These observations are consistent with the view that the fundamental patterns of rhythmic breathing are achieved within the medulla, that apneusis represents an overlay of inspiratory hypertonus akin to decerebrate rigidity and arising in a portion of the reticular facilitatory system of the lower pons designatable as the 'apneustic center.' The so-called 'pneumotaxic' center is related to the supressor mechanisms; it functions to prevent apneusis or respiratory hypertonus but it is not 'pneumotaxic' in the sense that this term implies responsibility for genesis of the respiratory rhythm. Ischemia and anoxia can be employed to inactivate differentially this hierarchy of control. (Authors' summary)

1144

Brennan, T. N. N. 1953
THE JUNGLE SURVIVAL PACK. — Proc. Roy. Soc. Med. (London), 46 (7): 529-530. 1953. DLC (R35.R7, v. 46)

Criticism of the jungle survival pack used by the Far East Air Force (R.A.F.) caused re-evaluation and redesign of the pack. The new pack was designed with the following features in mind: (1) it should occupy a minimum of space with the least discomfort to personnel; (2) it should provide protective coverings for jungle survival; and (3) it should contain adequate food, water, and medical aids. When the pack was used for a week by seven men on a trial exercise in the jungle, it was demonstrated that the actual salt intake was less than that prescribed to allow performance of duties. It was found advisable that no cathartic but rather, an antipurgative be included. Knowledge on the part of the crew members of the use of the equipment and of the terrain over which they fly offers the best chance of survival.

1145

Brill, N. Q., 1953
G. W. Beebe, and R. L. Loewenstein
AGE AND RESISTANCE TO MILITARY STRESS. — U. S. Armed Forces Med. Jour., 4 (9): 1247-1266. 1953. DLC (RC970.U7, v. 4)

A statistical study of correlations between age and military stress was carried out on the basis of a sample of 7,100 psychoneurosis cases which occurred in the U.S. Army in 1944 among enlisted men. The greatest amount of emotional breakdowns in all age groups occurred during the first year of service; this high ratio may partly be attributed to pre-existing emotional difficulties. The breakdown rate decreased during the second year, but approximated that of the first year during the third year of service, due to an accumulation of stress factors. The variation in breakdowns associated with age was most conspicuous during the first year, in which the older men broke down two or three times as often as the younger men. In the second year, the effect of age in producing variation in psychoneuroses is minimal, but became evident again in the third year. No evidence was found of significant age variation in resistance to combat stress among men in regimental combat. This finding may be explained by preceding selective influences. In all other environments, except regimental combat, relative resistance to stress conditions fell off rapidly with age.

The decline was least overseas in the rear of combat areas. The results of the study suggest that the 18- to 19- year age group is the most emotionally fit to resist the various stresses of military service. Resistance is declining up to age 38 without being critical, however, and age 38 must be regarded as an arbitrary dividing line.

1146

Brindley, G. S. 1953
THE EFFECTS ON COLOUR VISION OF ADAPTATION TO VERY BRIGHT LIGHTS. — Jour. Physiol. (London), 122 (2): 332-350. 1953. DLC (QP1.J75, v. 122)

Colour matches can be upset by adaptation to bright lights. The way in which a match of yellow against red+green is upset is independent of the waveband of the adapting light. Colour matches made with light passing through the centre of the pupil are upset when the light passes through the periphery of the pupil. The direction of upset is the same as that produced by adaptation, but the magnitude less. States resembling tritanopia and protanopia, and also states in which, over large ranges of the spectrum, no colour differences can be detected, can be produced by adaptation to certain very bright lights. Some quantitative characteristics of these states have been determined. All the present experimental results and some other published observations, can be explained if (1) three classes of receptors are active in foveal photopic vision; (2) the "red" receptors have a maximum optical density of photopigment about 0.5, which is decreased by adaptation to bright lights; and (3) in the foveal "blue" pathway many receptors converge on to each ganglion cell. (Author's summary)

1147

*Britvan, IA. M. 1952
[ON THE ROLE OF THE NERVOUS SYSTEM IN RESPIRATORY AND CIRCULATORY DISTURBANCES DURING VARIOUS STATES OF OXYGEN WANT] O roli nervnoĭ sistemy v rasstroĭstvakh dykhaniĭa i krovoobrashcheniĭa pri razlichnykh vidakh kislorodnoĭ nedostatochnosti. — In: Kislorodnaĭa terapiĭa i kislorodnaia nedostatochnost', p. 29-38. Kiev, 1952. In Russian.

A study was made of hypoxic conditions in the blood tissue and of stagnant anoxia in rabbits and cats under exclusion of the cerebral hemispheres and of the diencephalon. In the initial stage of hypoxia, an excessive stimulation of the respiratory and vaso-motor centers was observed, followed by inhibition and functional exhaustion. The changes in both centers were not always simultaneous. The duration of the hypoxic stages varied, as well as the intensity of reaction, the duration of survival, and the degree of stimulation received by the centers. Earlier experiments with various types of shock have shown that the sequence of the usual reaction periods of the respiratory center in response to oxygen want persisted after denervation of the carotid sinuses and simultaneous resection of the depressor nerves and after resection of the cervical vagus nerves. However, in these cases the reactions and interrelations of both centers were often atypical. The reaction of the respiratory center in response to oxygen want may occur with or without exclusion of the higher nervous centers. Variations in respiratory disturbances were found also in patients suffering from circulatory hypoxia. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiia (Moskva), 1953 (14): 42-43. DNLM (ZW1.qS729)]

1148

Broadbent, D. E. 1952b
FAILURES OF ATTENTION IN SELECTIVE LISTENING. — Medical Research Council, (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 168/51, Feb. 1952. 7 p., 2 plates. AD 119 233 UNCLASSIFIED
Also published in: Jour. Exper. Psychol., 44 (6): 428-433. 1952. DLC (BF1. J6, v. 44)

A series of experiments is presented on the selection of relevant parts of speech out of a mass of irrelevant messages. A group of 20 subjects found it easier to listen steadily to the voice in a mixture rather than to a change from voice to voice in obedience to a visual cue. This applied only when the voices were familiar. A group of 14 subjects, required to listen to two questions and answer both of them before the cycle was repeated, found it easier when the questions followed each other in time than when alternate words were heard from each voice. A third group of 12 subjects meeting the same condition as the previous one, but being requested to only answer one of the two questions, found still the alternate word condition harder. When vocal cues, available for discarding irrelevant information, were modified it appeared that if the same voice read both relevant and irrelevant information, it was harder to answer the relevant ones than if different voices read the two types of information. When the voice varied randomly from question to question, performance was as good as when the same voice was heard. This indicates that reidentification occurs in every message with an unfamiliar voice. These results have implications for the arrangements of communication centers. (Author's summary, modified)

1149

Broadbent, D. E. 1952c
SPEAKING AND LISTENING SIMULTANEOUSLY. — Jour. Exper. Psychol., 43 (4): 267-273. 1952. DLC (BF1.J6, v. 43)

The effect of overlapping messages in voice communications was investigated experimentally. A group of 24 subjects received questions over a loudspeaker to be answered by "yes" or "no". The following conditions were applied in separate tests: (a) new questions came in occasionally while the preceding questions were still being answered; (b) the questions followed each other continuously, so that all the answers had to be given while listening to new questions; and (c) there was no interruption during answers. About 90% of the responses were correct during runs in which only occasional interruptions occurred (a), and over 80% of the interrupting questions were adequately comprehended. When questions were given in a continuous run (b),

about 57% of the answers were correct; however, such performance was only achieved after a preliminary practice period. A control group of 11 subjects trained to follow abbreviated answering procedures showed no difference in performance with the exception of correctness in replying to occasional interruptions. It is concluded that the increase in the rate of overlapping messages causes a proportional deterioration in performance and that even a short series of words interferes with the comprehension of a fresh message.

1150

Broadbent, D. E. 1952d
LISTENING TO ONE OF TWO SYNCHRONOUS MESSAGES. — Jour. Exper. Psychol., 44 (1): 51-55. 1952. DLC (BF1. J6, v. 44)

Separate groups of test subjects were requested to reply to one of two auditory messages received simultaneously over a loudspeaker. The ability to answer correctly to the relevant messages increased in those groups which had been given a previous opportunity to listen to the corresponding speaker's voice. Similar results were obtained in groups aided by a visual display identifying the interfering voice. When an indication of the correct voice was given toward the end of the message rather than at the beginning, no improvement in performance was observed. A group receiving simultaneous messages with more distinct introductory call signs or with call signs repeated twice did not respond more efficiently than the group receiving ordinary auditory messages. It is concluded that simultaneous auditory signals cannot be distinguished effectively without the aid of added clues.

1151

Broadbent, D. E. 1953
THE ROLE OF AUDITORY LOCALISATION IN ATTENTION AND MEMORY SPAN. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 171/53, March 1953. 9+1 p. AD 22 165
UNCLASSIFIED

The investigation considered the relative efficiency of different types of auditory localization, the effect of changes in localization on two simultaneous auditory stimuli having their sources separated in space, and the limits of immediate memory on two channels. Test results suggested that (1) spatially-separated sources produced more correct answers, and the most efficient method of presentation was with one speaker and a single-ear headset or with two speakers on opposite sides of the subject; (2) with a 2-second presentation rate, spatial separation increased the accuracy, but, with a 1-second rate, spatial separation was a hindrance if the relevant channel was just changed; (3) spatially-separated sounds passed through the perceptual mechanism successively, and binaural memory span was shorter than the conventional span. (From AD abstract)

1152

Brody, S. I. 1953
THE OPERATIONAL HAZARD OF MICROWAVE RADIATION. — Jour. Aviation Med., 24 (4): 328-333. 1953. DLC (TL555. A1A4, v. 24)

Two frequency bands are in current use as radar beams: the 3-cm. and the 10-cm. Their effect on living organisms is essentially thermal in nature. The 3-cm. radiations are capable of producing considerable thermal manifestations; the energy being absorbed near the surface stimulates the sensory receptors in the skin and thus induces ample subjective warning of the presence of heat. On the other hand, radiations in the vicinity of 10 cm. do not elicit any subjective perception of heat or pain, but do produce extreme heat about 1 cm. below the surface of the skin in those structures not cooled by an abundant flow of blood: lens of the eye and the hollow organs, i.e., gall bladder and urinary bladder. Lethal effects, determined in animal experiments, are attributed to a generalized increase in body temperature which ultimately produces a thermal paralysis of the respiratory center. Another serious aspect of the microwave hazard is the production of cataracts following exposure to the 10-cm. radiation spectrum. Clinical data on damage produced by microwaves and methods for treatment are described. Safety measures, such as, metal screening, indicator lamps (neon gas tubes) for personnel, restrictions governing the carrying of metal in the vicinity of microwave radiation, should be instituted.

1153

Brown, Cabot 1953
THE EFFECTS OF RAPID CHANGES OF ALTITUDE ON PATIENTS UNDERGOING PNEUMOTHERAPY. — Diseases of the Chest, 23 (2): 175-185. 1953. DNLM

Ten patients undergoing pneumotherapy tolerated simulated altitudes of 10,000 ft. without discomfort or significant symptoms. One patient with unilateral pneumothorax remained free of symptoms at 18,000 ft. without oxygen. The results suggest that symptom-free pneumotherapy patients may fly safely without oxygen in modern pressurized aircraft.

1154

Brown, E[rnest] B., and F. Miller 1952
VENTRICULAR FIBRILLATION FOLLOWING A RAPID FALL IN ALVEOLAR CARBON DIOXIDE CONCENTRATION. — Amer. Jour. Physiol., 169 (1): 56-60. 1952. DLC (QP1. A5, v. 169)

Ventricular fibrillation and death have been produced in 11 of 15 dogs by a rapid reduction in alveolar carbon dioxide tension following 4 hours of breathing 30% to 40% carbon dioxide in oxygen. Cardiac arrhythmias appeared in the 4 dogs that survived the procedure. Two dogs subjected to the same high carbon dioxide for the same length of time showed no cardiac arrhythmias and survived the procedure when the alveolar carbon dioxide tension was reduced slowly. (From the authors' summary)

1155

Brown, E[rnest] B. 1953
PHYSIOLOGICAL EFFECTS OF HYPERVENTILATION. — Physiol. Reviews, 33 (4): 445-471. 1953. DLC (QP1. P45, v. 33)

This is a review article discussing the various physiological alterations produced by hyperventilation. The following items are discussed: blood and urine changes, respiratory control and sensitivity of the respiratory center to carbon dioxide after hyperventilation; cardio-circulatory changes; and neuromuscular changes resulting in tetany and nerve irritability. There is a short section devoted to clinical reports related to hyperventilation. A bibliography of 275 references, dating from 1864 to 1952, supplements the article.

1156

Brown, Fred R. 1953
A STUDY OF THE REQUIREMENTS FOR LETTERS, NUMBERS, AND MARKINGS TO BE USED ON TRANS-ILLUMINATED AIRCRAFT CONTROL PANELS. IV. LEGIBILITY OF UNIFORM STROKE CAPITAL LETTERS AS DETERMINED BY SIZE AND HEIGHT TO WIDTH RATIO AND AS COMPARED TO GARAMOND BOLD. — Naval Air Experimental Station. Aeronautical Medical Equipment Lab., Philadelphia, Pa. Report no. TED NAM EL-609, Part 4, March 10, 1953. 19 p., 8 plates. AD 10 211 UNCLASSIFIED

Results are reported of (1) letter-height tests with capital block letters having a height/width ratio (H/W) of 1 and heights of 0.12 to 0.18 inch; (2) H/W tests with H/W varying from 1 to 1.81; and (3) experiments with Garamond Bold letters reduced to a 0.156-inch height. The letters were presented tachistoscopically to naval enlisted men under daylight flooding and transillumination conditions. The legibility increased with increasing W for a constant H of 1.56 in. A legibility decrement occuring between H/W's of 1.43 and 1.81 indicated that W should be at least two-thirds of H. Capital block letters were generally more legible than those of the Garamond Bold font, particularly in daylight. The most suitable heights appeared to be 0.141 in. for most lettering and 0.172 in. for occasional size-emphasized legends. Recommendations are made for using the letters on plastic plates of control panels. (AD abstract)

1157

Brown, John L., 1953
C. H. Graham, H. Leibowitz, and H. B. Ranken
LUMINANCE THRESHOLDS FOR THE RESOLUTION OF VISUAL DETAIL DURING DARK ADAPTATION. — Jour. Optical Soc. Amer., 43 (3): 197-202. 1953. DLC (QC350. O6, v. 43)

Luminance thresholds for the visual resolution of various widths of alternating light and dark lines were determined at various times during dark adaptation. The finest gratings, representing high degrees of visual acuity, show only a single cone curve that drops from a high luminance threshold during the first moments of dark adaptation to a final steady level that is reached after about 7 to 10 minutes in the dark. Coarse gratings produce a duplex curve that shows an initial cone portion and a delayed rod portion. Visual acuity is a parameter that sets the position of a given curve on the log. threshold axis. The higher the degree of resolution required, the higher the dark adaptation threshold. At a constant grating luminance, visual acuity rises rapidly to a maximum during dark adaptation; the higher the luminance, the earlier and more rapid the rise and the higher the maximum. Visual acuity increases at all dark adaptation times with increase in luminance. (Authors' abstract)

1158

Brown, John L., 1953a
and A. L. Diamond
A DEVICE FOR SIMULATING THE VISUAL DISPLAYS OF PPI SCOPES. — Jour. Optical Soc. Amer., 43 (12): 1143-1146. 1953. DLC (QC350. O6, v. 43)

A circular transparency which duplicates the decay characteristic of a P-7 phosphor is carried by a rotating annulus. The density gradient of the transparency is such that the luminance of a given point on an illuminated screen in front of which it is rotated decreases with respect to time in the same manner as the luminance of a phosphor after excitation. The annulus is rotated at different speeds by a synchronous motor through a system of change gears and a friction drive. The spectral characteristic of the phosphor is duplicated as closely as possible by the use of an appropriate Wratten color filter. Variations in over-all brightness of the presentation are obtained with polaroids and neutral density filters. A wide range of contrasts between the "target" and background is achieved by using a small piece of cellophane cut in the desired shape to represent the target. This is located between the polarizer and the analyzer. Variations of luminance of the target and background are obtainable independently by appropriate changes in the relative orientations of the optical axis of the cellophane and the axes of polarization of polarizer and analyzer. (Authors' abstract)

1159

Brown, John L., 1953b
A. L. Diamond, and H. E. Adler
EFFECT OF DURATION OF LIGHT ADAPTATION ON TIME REQUIRED FOR DETECTION OF A TARGET ON A SIMULATED PPI SCOPE. — Jour. Optical Soc. Amer., 43 (12): 1147-1152. 1953. DLC (QC350. O6, v. 43)

Times required for the detection of a target on a simulated PPI scope were determined for various scope luminances after different durations of light adaptation to a luminance of 3100 millilamberts. Increased duration of light adaptation results in increased detection time up to a maximum

value which varies with scope luminance. In general, detection time decreases with either an increase in target luminance or a decrease in background luminance for a given duration of light adaptation. Within the range of luminances investigated, changes in target luminance result in a greater change in detection time than comparable changes in background luminance. The implication for radar scope viewing after adaptation to a high luminance is that optimum visibility will be obtained with maximum gain and as much negative bias as is possible without appreciable reduction of target luminance. (Authors' abstract)

1160

Brown, Judson S., 1952
M. Haire, L. Gregg, and J. Hornseth
AN EXPLORATORY STUDY OF PERFORMANCE ON THE E-26 FLEXIBLE GUNNERY TRAINER. — Univ. of Wisconsin, Madison (Contract AF 33(038)23294); issued by Human Resources Research Center. [Armament Systems Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. FG 52-1, Jan. 1952. 22 p. (Project no. 512-024-0001). AD 102 213
UNCLASSIFIED

The exploratory study reported herein was designed to provide information bearing on the reliability of the E-26 Flexible Gunnery Trainer and on the amount and rate of learning that takes place as the result of extended practice on the trainer. The basic design called for the testing of 20 subjects daily, each subject to be given practice on 20 attacks per day. Because of both apparatus and administrative difficulties beyond the control of the experimenters there was a marked attrition in the number of subjects and none of them could be given more than nine days of practice. The following conclusions must be regarded, therefore, as extremely tentative: (1) Of the three basic proficiency scores obtained, i. e., elevation tracking (E), ranging (R), and azimuth tracking (A), only the first two were acceptably stable. The third exhibited extreme fluctuations which could be attributed directly to instability of the azimuth scoring system. This instability was also reflected in the composite scores AER and AERT. The degree of improvement in performance appeared to be most marked as estimated by the elevation score and least marked for the AERT score. (2) Inter-day correlation coefficients, though based on an insufficient number of cases, suggest that if problems of apparatus variability are reduced the reliability of the trainer may prove to be reasonably satisfactory. This possibility can be checked only by a repetition of the experiment with an apparatus having a reliable scoring system and with a larger number of subjects. (Authors' summary and conclusions)

1161

Brown, Kenneth T. 1953
FACTORS AFFECTING RATE OF APPARENT CHANGE IN A DYNAMIC AMBIGUOUS FIGURE AS A FUNCTION OF OBSERVATION TIME. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-482, Dec. 1953. v+32 p. (RDO no. 694-41). AD 34 415
UNCLASSIFIED

An improved ambiguous figure and apparatus were developed for studying the rate of apparent change (RAC) of an ambiguous figure (i.e., a figure which may be perceived in more than one way). Curves showing RAC as a function of observation time were obtained with relative ease and accuracy. The curve increased rapidly up to two minutes and then gradually leveled off. Marked individual differences were found in both the height and slope of this curve. Curves for the left and right eyes were identical in all 8 subjects tested, but the binocular curve was higher over its entire extent than the monocular curve. The interocular transfer of increase in RAC was about 100%; this suggested that the physiological process causing the apparent changes was common to both eyes and was probably located in the visual cortex. The findings support the hypothesis that the same physiological process which causes figural after-effects also causes changes in an ambiguous figure. (AD abstract)

1162

Brown, Kenneth T. 1953a
FACTORS AFFECTING DIFFERENCES IN APPARENT SIZE BETWEEN OPPOSITE HALVES OF A VISUAL MERIDIAN. — Jour. Optical Soc. Amer., 43 (6): 464-471. 1953.
DLC (QC350.O6, v. 43)
Reprint issued also as: Wright Air Development Center. Aero Medical Lab. Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-253, Aug. 1953. (RDO no. 694-45). AD 30 826
UNCLASSIFIED

Measurements were undertaken on 6 subjects of the half-meridional difference (HMD), i.e. the difference in apparent size between opposite halves of the same visual meridian. The right, left, and both eyes were tested separately, and differences in HMD were observed between right and left eye and between horizontal and vertical meridians. The experiments were repeated over a stretch of several weeks, and HMD's were found to change gradually with time. This is attributed to the fact that for a given locus of retinal stimulation the subjective directional value relative to a foveal stimulus varies with respect to time.

1163

Brown, Robert H., 1953
and A. W. Baldwin
APPARATUS FOR RESEARCH ON THE DISCRIMINATION OF VELOCITY. — Naval Research Lab., Washington, D. C. NRL Report no. 4283, Dec. 14, 1953. i+6 p. (RDB Project no. NR 513-050). AD 23 412 PB 111305

In order to provide for more efficient control in tracking, the visual processes of the tracker in predicting the motion of a target are studied. The equipment is such that the observer in a dark room views the center of a circular black screen surrounded by a dimly illuminated circular area. He sees the target, a moving spot of white light, appear in the center of this configuration and reports its direction of movement. An optical system projects the target image on the screen from the rear.

A rotating disc shutter provides for an exposure time which may be varied between one millisecond and five seconds. Neutral tint filters and wedges control the brightness of the spot. Its direction and speed of movement are determined by a mirror in the light beam. The system is calibrated photometrically for brightness and photographically for the duration and speed of the image. (Authors' abstract, modified)

1164

Brown, W. R. J. 1952
THE EFFECT OF FIELD SIZE AND CHROMATIC SURROUNDINGS ON COLOR DISCRIMINATION. — Jour. Optical Soc. Amer., 42 (11): 837-844. 1952. DLC (QC350.O6, v. 42)

Visual sensitivities to color differences were determined for four colors in the presence of five surrounding fields. The colors matched were red, green, blue, and white. The surrounding fields were successively red, green, blue, white, and black. Color-discrimination ellipsoids were determined for the above conditions for matching fields subtending 12 degrees and 2 degrees. Large visual fields allow better color discrimination than fields covering only the foveal region. For small matching fields, discrimination is reduced by surrounding fields of different color. With large (12-degree) matching fields, color discrimination is relatively independent of the surroundings. (Author's abstract)

1165

Browne, R. C. 1952
FATIGUE—FACT OR FICTION? -- In: Ross, S., Report on "Symposium of Fatigue"..., p. 19. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222).
AD 31 309 UNCLASSIFIED

The first world war, with its emphasis on industrial effort and working at nights, stimulated work on the effect of sleep deprivation upon performance, and it was shown in laboratory tests that lack of sleep, after initially stimulating the performance, then caused it to deteriorate. It was noticed also that there was very little connection between the subjective feelings of a fatigued person and his objective achievement. A contribution to the study of fatigue from the U.S.A. showed that one of its signs might be a type of mental blocking, in which there appears to be a complete cessation of mental activity. The length and frequency of these blocks were found to increase in parallel with the number of errors made in performance. The development of the aircraft and the increasing lengths of flights directed attention to the diminution of fatigue by careful design of the aircraft cockpit and the arrangement of the controls and displays in it. Flying at night was found to decrease the ability of aircraft pilots to carry out their normal procedures, and a diurnal-nocturnal rhythm of performance was demonstrated in the industrial environment of a teleprinter switchboard. Very long application to a task produces symptoms in the subject and signs in the performance. Performance, moreover, is closely related to environment, and it has a natural diurnal and nocturnal rhythm. In view of the many functions which the human being can carry out, however, there cannot be a single entity called 'fatigue", neither can there be a single test for it. (From the author's abstract)

1166

Browne, R. C. 1952a
FIGURE AND GROUND IN A TWO-DIMENSIONAL DISPLAY. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 791, July 1952. 8 p. AD 5429 UNCLASSIFIED

The speed and accuracy of human response to two displays has been determined, which differed in: (1) the relation of figure (the outline of the airplane in frontal view) and ground and their relative movement; (2) the damping of the oscillations after a given displacement of the figure against the horizon; and (3) their relative complication. The speed and accuracy of response was greater with the more simple display which had the heavier damping. This display also needed a shorter instruction time and was preferred more often by the subjects. Within the limits of the experimental design employed the pure figure and ground relation alone appeared to play little part in perception. The individual differences between subjects increased as perception became more difficult. But the differences between different samples of a single subject's performance remained constant. In an experimental design learning transfer between different tests must not be considered to be the same. Neither is matching groups of subjects on an assumed analogous test experimentally safe. (Author's summary, modified)

1167

Brozek, J., 1953
E. Simonson, and H. L. Taylor
CHANGES IN FLICKER FUSION FREQUENCY UNDER STRESS. — Jour. Applied Physiol., 5 (7): 330-334. 1953 DLC (QP1.J72, vol. 5)
Reprint issued also as: School of Aviation Medicine, Randolph Field, Tex. Report no. 3, Oct. 1953. (Project 21-32-004) AD 21 227 UNCLASSIFIED

Flicker fusion frequency (FFF) was determined in two groups of subjects twice daily (during the first and last half-hour of the work day) for two consecutive days under the following conditions: induced visual stress (two hours of hard work under varied illumination), nutritional stresses (starvation, starvation plus hard work, semi-starvation, acute thiamine deficiency), and miscellaneous severe stresses (hard physical work on the treadmill, work in hot environment of 90°F. to 120°F., or lack of sleep for three days and two nights). All these stress conditions resulted in a more or less significant decrement of FFF. The mechanisms involved are not clear and appear to be different for the biological, physiological, and neurophysiological stresses studied. Therefore the decrease in fusion level is not a reliable index of the

involvement of the central nervous system in biological stresses as applied in this experiment.

1168

Buchthal, F., and M. Lennox 1953
THE EEG EFFECT OF METRAZOL AND PHOTIC STIMULATION IN 682 NORMAL SUBJECTS. — Electroencephalography and Clinical Neurophysiol. (Montreal), 5 (4): 545-558. 1953. DNLM

Electroencephalograms were recorded of 682 Air Force applicants (1) at rest, (2) during hyperventilation (3 min.), and (3) during photic stimulation (3 min.). Intravenous injections of 10% solutions of metrazol were given to 671 subjects immediately after photic stimulation. The resulting EEG recordings were classified as normal, borderline, slightly abnormal, markedly abnormal, questionably paroxysmal, and paroxysmal. The paroxysms which were induced by hyperventilation or photic stimulation were compared with those induced by metrazol. A correlation of the data obtained from the electroencephalograms and from the subsequent service disposition of the applicants indicated that metrazol-induced paroxysms were not of great value in predicting whether applicants would complete service training successfully. Of the 682 applicants tested 46% completed their training successfully, about 25% were dismissed from training, and 30% were rejected. It was significant that included among the applicants who completed training, were individuals with markedly abnormal or paroxysmal EEG responses to hyperventilation, to photic stimulation, or to metrazol injections.

1169

Buckley, J. P., L. D. Edwards, and W. A. Hiestand 1953
EFFECT OF DISCONTINUOUS DECOMPRESSION ON BLOOD PRESSURE IN THE RAT. — Amer. Jour. Physiol., 175 (1): 93-95. 1953. DLC (QP1.A5, v. 175)

Rats exposed to discontinuous decompression equivalent to an altitude of 30,000 feet for 2 hours/day for 19 weeks became progressively hypertensive. When returned to ordinary air pressure for 8 weeks following the period of decompression, the blood pressure remained elevated. Rats treated with the drugs strychnine, epinephrine, and papaverine daily during the decompression period showed no significant difference from the untreated but decompressed animals Erythrocyte number did not change during the decompression period indicating that no hypoxia resulted and therefore the hypertension was entirely due to the physical pressure reduction. Histopathological changes were restricted to the lungs and kidneys, the former showing enlargement of the alveolar sacs with narrowing of the walls, while the latter showed some uriniferous tubule dilatation. Some distention of veins occurred but the arteries were not visibly affected. (Authors' summary)

1170

Buettner, K. J. K. 1953
THERMAL STRESSES IN THE MODERN AIRCRAFT. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 7-13. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

A table showing temperature classifications according to human tolerances is given. The criteria investigated are tolerance time, warning symptoms, body adjustment, changes of skin and core (rectal) temperatures, and essential properties of protective clothing. It has been found that the thermal characteristics of the body are dependent upon body tolerance and adjustment. In emergencies, shivering and sweating complement normal temperature control mechanisms. Vasodilatation and blood convection raise the resistance of the body. An unpublished mathematical analysis by the author of transient conditions in man (in a hot environment) indicates that blood flow is controlled by internal temperature; the work load on the circulatory system seems to be a limiting factor in heat tolerance. Proposals are advanced for the prevention of thermal injuries by proper adjustments in the aircraft and in clothing as well as in man himself. (27 references)

1171

Bugard, P. [J.], H. Souvras, P. Valade, E. Coste, and J. Sallé 1953
[HEMATOLOGICAL REACTIONS IN ANIMALS EXPOSED TO THE ACTION OF NOISES OR INTENSE ULTRASOUNDS, PROPAGATED BY AIR: STUDY OF ERYTHROCYTES] Réactions hématologiques chez des animaux soumis à l'action de bruits ou d'ultrasons intenses se propageant dans l'air. Etude des hématies. — Comptes rendus de la Société de biologie (Paris), 147 (21-22): 1733-1735. 1953. In French. DLC (QP1.S7, v. 147)

Dogs, guinea pigs, and rabbits were exposed to noises or ultrasounds of low frequency. The following noise sources were employed: an airplane motor (125 db.) a turbojet and a pulse-jet engine (130 db.), a pulse-jet engine (135 db.), a whistle (130 db.), and a siren (150 db.). Short-duration tests lasted 1-4 minutes; long-duration tests lasted 300 hours for the motor and 109 hours for the turbo-jet engine, at two 4-hour sessions daily with quiet intervals. Blood-counts were made 4 hours after the exposure. Short-duration tests induced either an increase or a 20% decrease in the number of erythrocytes. Complex noises (motor and jet engines) produced no significant reaction. Ultrasounds (siren and whistle) induced moderate temporary anemia; however, neither hematuria nor other hemic disturbances were observed, nor did histological examination of the spleen reveal an excessive reduction of erythrocytes. The sedimentation rate showed no significant variation after 1, 2, and 24 hours. After the long-duration tests, animals exposed to sound levels, intolerable for man, became deaf; but their general condition, their weight, and their erythrocyte count remained practically unchanged, which is indicative

of noise adaptation. It is suggested that the moderate anemia observed in mechanics is not due to the specific action of complex noises, but possibly to the toxic action of combustion gases.

1172

Bugard, P. [J.], 1953a
H. Souvras, P. Valade, E. Coste, and J. Salle
[HEMATOLOGICAL REACTIONS IN ANIMALS EXPOSED TO THE ACTION OF NOISES OR TO INTENSE ULTRASOUNDS PROPAGATED BY AIR. STUDY OF THE LEUCOCYTES] Reactions hematologiques chez des animaux soumis a l'action de bruits ou d'ultrasons intenses se propageant dans l'air. Etude des leucocytes. — Comptes rendus de la Société de biologie (Paris), 147 (21-22): 1785-1788. 1953. In French.
DLC (QP1.S7, v. 147)

A study of leucocytes (neutrophiles, eosinophiles) was made on dogs, guinea pigs and rabbits immediately following, and 4 and 12 hours after inflicting an acoustic trauma, under the experimental conditions set forth in the papers (Bugard, P., 1953a). Noises and ultrasounds of short duration induced leucocytosis, while long exposure induced hyperleucocytosis. Neutrophiles underwent important changes 4 hours after the acoustic trauma: the sound of a motor induced slight, a siren considerable polynucleosis. In the dogs, the number of polynuclear leucocytes increased. Extended acoustic trauma caused pronounced polynucleosis, an increase in the total amount of leucocytes, and some mononucleosis. Exposure to a whistle sound was followed at first by considerable eosinophilia (8-10 times the initial number) and 4 hours later, by eosinopenia, neutrophile polynucleosis, and some lymphopenia. After a 300-hour exposure to motor noise, the eosinophil count in rabbits had doubled. The hematic changes induced by complex noises are considered to be of a nonspecific character; contrary to sound-induced deafness, they appear to be secondary reactions. The experimental reactions in animals differ somewhat from the human syndrome (fatigue, anemia, leucopenia, and neutropenia), which includes not only a vibratory, but a toxic etiology as well.

1173

Bugard, P. [J.], 1953b
H. Souvras, P. Valade, E. Coste, and J. Sallé
[FATAL EFFECTS OF INTENSE, LOW-FREQUENCY ULTRASOUNDS, PROPAGATED BY AIR] Action mortelle d'ultrasons intenses de basse fréquence se propageant dans l'air. — Comptes rendus de la Société de biologie (Paris), 147 (23-24): 1918-1921. 1953. In French.
DLC (QP1.S7, v. 147)

A study was undertaken of the fatal effects of ultrasounds. Rabbits were exposed to the sound of a low-frequency siren (22.5 kilocycles/sec.) of very high intensity (165 db.). After a 5-minute exposure, a syndrome consisting of intense polypnea, posterior body paralysis, and hyperthermia (44.5 - 45.5°C) was observed. The heat released by the ultrasonic energy burned the animals' hair and skin. Death occurred after 8-12 minutes of exposure (average 10 min.) in unshaved animals, and after 7-21 minutes (average 12 min., 30 sec.), if the animals' sides were shaved. The longer survival time in the latter group is attributed to the effects of less impeded heat radiation. Unshaved rabbits exposed for 6 minutes died after 13 minutes. After a 4-minute exposure, they survived from 3 minutes to 30 hours; after a 2-minute exposure, some animals survived, but suffered motor ataxia. Autopsies revealed congestion and edema in the brain, in the lungs, in the liver, and in the kidneys, and coagulation of the myocardial myosine. The fatal effects depend on exposure time and on sound level. In the case of very high intensity and low frequency, fatality seems to be due to thermic action rather than to mechanic lesions. This is in contrast to physiological effects on the nervous and endocrine systems observed at lower sound levels.

1174

Bugard, P. [J.], 1953c
H. Souvras, P. Valade, E. Coste, and J. Sallé
[ENDOCRINIC REACTIONS IN ANIMALS SUBJECTED TO THE ACTION OF NOISES OR INTENSE ULTRASOUNDS, PROPAGATED BY AIR] Réactions endocriniennes chez des animaux soumis à l'action de bruits ou d'ultrasons intenses se propageant dans l'air. — Comptes rendus de la Société de biologie (Paris), 147 (23-24): 2007-2009. 1953. In French. DLC (QP1.S7, v. 147)

Dogs, guinea pigs, and rabbits were exposed to strong noise from 1 minute to 4 hours and from 100 to 300 hours. Their endocrine glands were examined 4 hours after exposure. The following histological changes were observed: (1) In the thyroid, the colloid substance had shrunk, looked pale, and was pitted by numerous resorption lacunae. (2) The adrenal glands gave evidence of great activity, with lipidic excess in the fascicular zones, which looked much thicker than in the controls; the spongiocytes were hypertrophied, turgescent, and filled with large lipid globules; the reticular zones also were hypertrophied in rabbits. (3) The anterior hypophysial lobe showed a very pronounced increase in eosinophile cells as compared to the main (chromophobe) cells. (4) Blood sugar content had increased only upon exposure to jet engines. (5) The thymus gland and the lymphatic ganglia remained unchanged. And (6) the spleen remained normal. Exposure to noise of long duration, however, induced no hyperactivity in endocrine glands, whose aspect remained normal. This confirms the assumption that adaptation to noise takes place, provided that noise intensity remains below the critical acoustic level of 160 db. Concurrent with the adaptation process, however, deafness is induced, probably as a means of protection.

1175

Bugard, P. [J.], 1953d
and P. Souvras
[THE TRAUMATIC VIBRATORY SYNDROME IN MAN: GENERAL DISORDERS; THE TRAUMATIC-VIBRATORY SYNDROME AND INDUSTRIAL MEDICINE] Le syndrome traumato-vibratoire humain: troubles généraux. La S. T. V. et

la médecine du travail. — Médecine aéronautique (Paris), 8 (1): 78-80. 1953. In French.
DLC (TL555.M394, v. 8)

The traumatic-vibratory syndrome affecting mechanics and maintenance personnel exposed to intense noise and vibration is characterized by a slowly progressing deafness with corresponding lesions of the internal and middle ear, and a general feeling of fatigue, usually of regressive nature. Asthenia is the dominant feature of this condition, accompanied by subjective symptoms such as frontal headache, and occasional vertigo. Among the objective symptoms, arterial hypotension is always prevalent in asthenia. Examination of the blood reveals a decrease of eosinophils, a moderate agranulocytosis and mononucleosis. The urinary elimination of the 17-ketosteroids decreases and there is an increase in vestibular chronaxia. Disturbances caused by the traumatic-vibratory syndrome are seldom grave; only about 2% of subjects exposed to intensive vibration and noise experienced any inconvenience. Protection against these disturbances would include an audiometric test every six months, the soundproofing of the working benches, and wearing of ear defenders and protective clothing. — Acoustic pressure above 150 decibels may cause sudden deafness and other disturbances.

1176

Bugard, P. [J.], 1953e
P. Valade, E. Coste, and J. Sallé
[THE EXPERIMENTAL TRAUMATIC-VIBRATORY SYNDROME] Le syndrome traumato-vibratoire experimental. — Medecine aeronautique (Paris), 8 (1): 81-84. 1953. In French.
DLC (TL555.M394, v. 8)

Physiological changes noted in various animals (dogs, rabbits, and guinea-pigs) following exposure to high-intensity sounds and ultrasonic frequencies are analyzed. These sounds simulated the noise level around testing benches of airplane motors. A 4-hour exposure to frequencies of 130 to 140 db. resulted in moderate disturbances. The following physiological reactions were noted: the erythrocyte count was usually unchanged but, in certain cases, there was a fluctuation in sedimentation rate accompanied by polynucleosis, and a decrease in eosinophiles and lymphocytes. After an 18-hour exposure, however, mononucleosis and an increase in the glycemia level was evident, and after a 48-hour exposure the urinary elimination of the 17-ketosteroids decreased. Electroencephalographic examination of the rabbit showed emotive reactions after the onset of the exposure; after six hours of exposure to noise generated by jet engines, a marked cortical hyperactivity was noted. Degeneration of myocardiac fibers and of the cellular structure of the adrenal medulla were noted in cases which resulted in death because of exposure to an air siren (160 db). In the hours following exposure to high-intensity sounds certain changes in the endocrine system were noted, [hyperactivity of the anterior pituitary affecting the thyroid and the adrenal medulla, a phagocytic hyperactivity in the spleen, and involution of the thymus.] The lymphatic glands and the gonads remained normal. [After exposure to pulse-jet and turbo-jet engine noise moderate] Oedematous reactions were observed on the cerebral cortex.

1177

Bulanova, K. N. 1953
[VISUAL THRESHOLDS IN THE FOVEAL REGION OF THE RETINA] Svetovye porogi v foveal'noĭ chasti setchatki. — Doklady Akademii Nauk SSSR (Moskva), 93 (1): 29-30. 1953. In Russian.
DLC (AS262.S3663, v. 93)

Visual thresholds were measured and thresholds of color perception determined in 9 subjects in response to 4 lines of mercury: red (690-709 mμ), yellow (577-579 mμ), green (546 mμ) and blue (435 mμ). After dark-adaptation, the subjects looked at round color-objects 4' to 2° in size. Results showed that, in the foveal region of the retina, the threshold character changes in accordance with the size of the objects. Ricco's law (intensity x area = constant) applies to thresholds for color objects with small surface, up to 10-15'. For objects below 35-40' no achromatic threshold can be obtained at any light source; for objects of 50' to 2° an achromatic threshold can be obtained for all light sources, except red. At threshold, small objects (up to 20') are always perceived as saturated blue, objects of 20-40' appear diluted with white (some see them as light blue, others as blue, still others as dark blue); objects of 40-60' appear of an indefinite color, called "grey" by most subjects; objects exceeding 1° only are perceived by most subjects as white at threshold. The author concludes that the cause for contradictory data on the achromatic threshold in the foveal region is the utilization by various authors of objects of unequal dimensions. Moreover, the terminology used by them may lead to confusion, when it is not specified whether they referred to saturated or non-saturated colors.

1178

Bullock, D. H., 1953
L. S. Braley, and S. R. Meyer
RESEARCH ON MULTIPLE-CHANNEL MONITORING. — Univ. of Buffalo, N. Y. Progress Report no. 1, Sept. 15, 1953. 4 p. (Contract AF 30(602)-574). AD 22 288 UNCLASSIFIED

Efforts were directed toward selecting a suitable visual channel for study. Films presenting visual search tasks, which involve locating the position of dots in matrices, were promising. Tests concerning the auditory channel were concentrated on the tape-recorder presentation of dot-dash sequences. In these tests, the subject was required to reproduce the sequence with a telegraph key, to locate the position of difference between two patterns, or to discriminate between similar and dissimilar patterns. Efforts will be made to establish functionally equivalent visual and auditory channels to allow comparable statistical analyses in terms of information theory concepts. Plans provide for the scoring of the accuracy and the latency of performance. (AD abstract)

1179

Burch, B. H., 1953
J. P. Kemph, E. G. Vail, S. A. Frye, and F. A. Hitchcock
SOME EFFECTS OF EXPLOSIVE DECOMPRESSION AND SUBSEQUENT EXPOSURE TO 30 mm. Hg UPON THE HEARTS OF DOGS. — In: Ohio State Univ., Studies in explosive decompression,

p. 95-103. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77).
AD 27 765(k) UNCLASSIFIED

Reprint of the paper, Burch, B. A., 1952.

1180

(Bureau of Medicine) 1953
NAVAL AVIATION MEDICAL RESEARCH. — In: Roddis, L. H., and J. L. Schwartz. The History of the Medical Department of the United States Navy in World War II, v. 1, p. 228-241. Office of the Surgeon General (Navy), Washington, D. C., 1953. DLC (D807.U6A53, v. 1)

After 1942, aeromedical research in the U. S. Navy was incorporated into the Research Division of the Bureau of Medicine and Surgery as the Aviation Medicine Branch. The specific objective of this unit during World War II was to apply the results of aeromedical research to flight safety and flight efficiency, and to increase the caliber of flight personnel through improved selection and training. The following studies were carried out by one or more of the research units: effects of acceleration, development of clothing, dental care, emergency food rations, water purifiers, motion sickness, decompression illness, disturbances of vision, respiratory functions during flight, and effects of drugs on performance. Safety devices and survival equipment were tested and some human engineering problems were solved by these groups.

1181

(Bureau of Naval Personnel) 1953
AIRCRAFT SURVIVAL EQUIPMENT. — Bureau of Naval Personnel, Washington, D. C. Navy Training Courses. NAVPERS 10352-A, 1953. v+202 p. DLC (VG93.A65)

This instruction manual presents concise descriptions of sea rescue equipment for the use of aviators forced to bail out in midocean. The following are among the items discussed: life rafts, survival and first aid kits, desalting kits, solar stills, sunburn ointments, life vests, exposure suits, anti-blackout suits, and oxygen equipment. Basic survival practices are outlined.

1182

Burgemeestre, A. J. 1953
AUDITORY MASKING IN CONTINUOUS AUDIOMETRY. — Acta oto-laryngologica (Stockholm), 42 (6): 506-516. 1953. In English. DNLM

A masking method for continuous audiometry is described in which the masking noise intensity depends upon the test level. By "test level" is understood the intensity at which, in continuous audiometry, the perceptible frequency span is determined. By determining this span at various test levels, a threshold curve is obtained -- the continuous audiogram. In bone-conduction audiometry, the intensity of the masking noise must be 30 db. above the test level, i.e., the masking noise must be 40 db. above the average normal noise threshold at a test level of 10 db.; at a test level of 20 db., the masking noise must be 50 db. above the average normal noise threshold, etc. In air-conduction audiometry, the intensity of the masking noise must be at the test level. The masking method described above satisfies the two basic requirements which a proper masking method has to fulfill: (1) sufficient masking capacity (i.e., the test tone must not be perceived by the contralateral ear which is not being examined); and (2) no "shadow-masking" (i.e., the masking noise must not alter the threshold curve of the ear which is being examined). (Author's abstract, modified)

1183

Burke, C. J., 1953
R. Narasimban, and O. J. Benepe
SOME PROBLEMS IN THE SPECTRAL ANALYSIS OF HUMAN BEHAVIOR RECORDS. — Indiana Univ., Bloomington (Contract AF 18(600)-16); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-27, July 1953. iii+6 p. (RDO no. 694-39). AD 18 754
UNCLASSIFIED

The theory of spectral analysis assumes an infinite length record. However, only finite records are ever available to the experimenter. In analyzing samples of human performance this limitation may be particularly acute since lengthy records cannot be obtained without involving the risk of violating, due to fatigue and learning effects, the assumption of a stationary time series. The report describes, mathematically, the effects of finite length of record upon the spectral analysis of function with and without unsystematic components. The lack of an analytic mathematical basis for spectral analysis of human behavior is demonstrated, and the necessity of empirical investigation to establish its validity is pointed out. (Authors' abstract)

1184

Burnham, R. W., 1952
R. M. Evans, and S. M. Newhall
INFLUENCE ON COLOR PERCEPTION OF ADAPTATION TO ILLUMINATION. — Jour. Optical Soc. Amer., 42 (9): 597-605. 1952.
DLC (QC350.O6, v. 42)

Six experienced observers made consistent determinations of various colors, which appeared the same with adaptation to tungsten light and to artificial daylight. These observations were made with each eye viewing a different color patch and with the patches appearing juxtaposed at the middle of a fused binocular field. The method was to make the two juxtaposed patches match by adjusting one of them, sometimes when both eyes were adapted to the same illumination and sometimes to the different illuminations. Plots of the data in the CIE chromaticity diagram indicate a systematic shift in color appearance toward the blues when adaptation was changed from daylight to tungsten; or toward the yellows when adaptation

was changed from tungsten to daylight. The magnitude of this color shift was substantial, at least in the considerable color region investigated, for here the average length of the representative vectors was 0.10 in CIE terms or of the order of 20 just perceptible color differences. Qualitatively, the results confirm those of R. W. G. Hunt (Jour. Optical Soc. Amer., 40: 362. 1950) and of G. T. Winch and B. M. Young (G. E. C. Journal, 18: 88, April 1951). The theoretical implications will be discussed in a later paper. (Authors' abstract)

1185

Burnham, R. W., 1953
and S. M. Newhall
COLOR PERCEPTION IN SMALL TEST FIELDS. — Jour. Optical Soc. Amer., 43 (10): 899-902. 1953. DLC (QC350.O6, v. 43)

Several small test colors were varied in size and shape to discover possible effects on their color appearance. Color appearance was evaluated colorimetrically with a binocular septum viewer; the test color was viewed with one eye under the given conditions and matched with a variable mixture presented to the other eye under standard conditions. Increasing the area of the test colors from 25 to 500 sq. minutes of visual angle evoked some significant increases in saturation and characteristic shifts in hue. These changes in perceived color were found to be independent of marked changes in rectangular shape. The observed changes are related to small-area tritanopia. (Authors' abstract)

1186

Burrows, A. A., 1953
and K. F. Jackson
PRELIMINARY DESCRIPTION OF AN ANOXIA-SENSITIVE PSYCHO-MOTOR TEST. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 859, Dec. 1953. 8+3 p.
AD 138 780 UNCLASSIFIED

An apparatus designed to test psychomotor performance under anoxic stress is described. The device consists basically of a moving paper tape covered with an irregular pattern of dots which the test subject is instructed to hit with a stylus. A successful hit results in the closing of a relay sending a pulse to the direct input system of a ratemeter. The output from the ratemeter is applied to a speed-regulating mechanism (a modified "velodyne" circuit). Thus tape speed is automatically built up with each successful attempt. Results are recorded graphically. Blood oxygen is recorded simultaneously by an oximeter.

The subject commenced "dotting" either at ground level for a period of 11 minutes, or in a decompression chamber as soon as an altitude of 25,000 feet was reached. Two types of curves were obtained: (1) a constant pulse rate (sinusoidal curve); and (2) a broken curve indicating a constant "build-up" phase up to a critical speed ("break-off point"). The break-off point indicates the level of efficiency. The following factors were found unsatisfactory: (1) The subjects knew when oxygen was switched on or off, thus responding to a suggestive situation; and (2) oximetry was too inaccurate to allow reliable conclusions from comparing curve amplitudes between the oximeter and speed recorders.

1187

Butler, F. C., 1952
and J. A. Tucker
A MOTION PICTURE TEST OF RADAR AIMING POINT DETERMINATION. — Human Resources Research Center, Lackland Air Force Base, Tex. Research Note no. AO 52-1, Feb. 1952. 7 p. (Project no. 506-006-0002). TIP U71411 and ATI 180 323 UNCLASSIFIED

Two experimental motion picture tests were developed in order to establish reliable criteria in radar scope interpretation and aiming point identification: (1) the APQ-23 radar scope return on the Sacramento marshalling yards, and (2) the bomb run on the Fresno yards. The first test required 14 responses and the second 20 responses. Both tests were administered to 39 officer navigators at the USAF Bombardment School. Each presentation of the cross-hairs counted as an item. Two judgments were made in each item concerning the location of cross hairs, estimating range and deflection giving a maximum score of 28 for the Sacramento test and 40 for the Fresno test. With regard to the reliability of the test, the following observations were made: to reach the desired position, the cross-hairs should not be placed on the scope face but directly on the test film. — A random selection of cross-hair locations is inadequate because it leaves the test developer without control. A careful study of a scope return must be made so that the position of the cross-hairs and the distances from the aiming points can be properly determined. — An adequate selection of targets is of equal importance.

1188

Byrnes, V. A. 1953
VISION AT HIGH SPEED AND ALTITUDE. — Aeronaut. Eng. Rev. 12 (4): 61-64, 70. 1953. DLC (TL501.A326, v. 12)

The following are specific visual problems related to high altitude flight: (1) reduced sky brightness, (2) reduced visibility within the craft, (3) reduced night vision (associated with hypoxia), and (4) general symptoms caused by barometric pressure, such as expanding scotomata. Of lesser concern are the effects of concentrations of ultraviolet light in flights over 120,000 ft. Travelling at speeds of 2000 m.p.h. or over, creates additional visual problems, e.g., slanting optical surfaces or distortion of distant images. Coupled with the above visual disturbances are errors caused by the pilot's latent period of perception and accommodation time. The distances travelled by high speed aircraft are so great that accidents may be unavoidable because of the time intervals involved. Turning the aircraft at supersonic speeds may also cause blackouts due to loss of blood supply to the eye. It is thought that the tearing of facial tissue and, hence, direct damage

to the eye may occur when exposed to blasts over 530 m.p.h.

1189

Byrnes, V. A. 1953a
VISION AT HIGH SPEED AND HIGH ALTITUDE. — Royal Thai Air Force Med. Gaz. (Bangkok), 2 (5-6): 379-388. 1953. In English. DNLM

Same as the paper, Byrnes, V. A., 1953.

1190

Caidin, M. 1952
ROCKETS BEYOND THE EARTH. — 304 p. New York: McBride Co., 1952. DLC (TL782.C2)

Accounts of test pilots on flights at supersonic speeds up to 53,000 ft. above the earth are included in this popular treatise on the development of rockets, of jet- and rocket-assisted aircraft, and of manned satellites. Authorities on aviation medicine have indicated that, before man can undertake rocket flights to outer space or exist for long periods of time aboard satellites in orbit, a number of physiological and psychological problems must be solved. In the chapter, "Man in the Void", the need for selection of personnel able to withstand the stresses which would be imposed by such a flight is emphasized. The author discusses further the training necessary to enable the men to do work under conditions of weightlessness. Research tasks are outlined which must be completed before manned rocket flights in orbits about 1075 miles above the earth can be realized.

1191

Cain, C. C., 1953
and D. I. Mahoney
THE EFFECT OF HIGH BREATHING PRESSURE ON CARDIAC OUTPUT WITH AND WITHOUT COUNTER PRESSURE. — Jour. Aviation Med., 24 (4): 308-321. 1953. DLC (TL555.A1A4, v. 24)

Ballistocardiographic studies of cardiac output while breathing 100% oxygen against pressures in the range of 0 to 150 mm. Hg indicate that the Emergency Partial Pressure Suit maintains subjects in approximately the same condition as that which is obtained while breathing against 30 to 35 mm. Hg without any protective counterpressure. Although this indicates that the counterpressure supplied by the capstans is not sufficient to neutralize completely the effect on cardiac output of increased breathing pressure, it does demonstrate that the suit is capable of maintaining a properly indoctrinated subject in relatively good condition for at least 30 minutes. This period is sufficiently long to permit descent from all altitudes above [?] 40,000 feet to safe pressure breathing altitudes in the event of sudden loss of cabin pressurization. Over the 20- to 30-minute period studied, the ballistocardiograms obtained could apply equally to the completely protected individual or to the subject who was able to compensate successfully for fluid loss for the duration of the experiment. (Authors' summary)

1192

Callaway, W. R., 1953
and C. O. Wallin
STUDY OF AN AIR-TRANSPORTABLE SURGICAL THEATER. — Oct. 1953. xvi+160 p. Wetmore Hodges and Associates, Redwood City, Calif. (Contract AF 33(600)-21641); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-468 (SEO no. 698-29). AD 23 168 UNCLASSIFIED

A study was made of the medical and engineering requirements for the modification of an air conditioned, air-transportable photographic semitrailer for use as a self-contained surgical theater. The medical study determine the personnel, equipment and installations necessary to effect major surgical procedures and the requisite medical materials for operating 24 hours without resupply. External shelter was planned for pre-operative care of patients. A method and mechanical lift was devised for handling patients in and out of surgery. The engineering study defined the power, water and fuel requirements, systems, and their auxiliary equipment. Analysis was made of the requirements for an air conditioning and heating system. Space and weight factors were reconciled to the interior cube of 1193 feet, and to the specified maximum gross vehicle weight of 18,000 lbs. Loading and storage of equipment were coordinated with the requisites for air transport and for the one-hour time limit for setup or closeup of the unit. A mock-up was constructed to demonstrate the space relationships of the installations in the semitrailer. (Authors' abstract)

1193

Campbell, E. J. M., 1953
and J. H. Green
THE EXPIRATORY FUNCTION OF THE ABDOMINAL MUSCLES IN MAN: AN ELECTROMYOGRAPHIC STUDY. — Jour. Physiol. (London), 120 (3): 409-418. 1953. DLC (QP1.J75, v. 120)

A method of studying the abdominal muscles electromyographically using surface electrodes is described. The activity of the external oblique and rectus abdominis muscles on the right side of young male subjects in the supine position was studied. The activity in the abdominal muscles on making a static expiratory effort is less when the chest is expanded than when it is in the resting position. This is probably chiefly due to the assistance of the relaxation pressure at full inspiration. The activity in the muscles during the increased pulmonary ventilation due to asphyxia is small compared with that recorded during static expiratory efforts or in maximal voluntary breathing. The activity in the muscles on maximal expiratory effort is small compared with that recorded during the performance of skeletal movements employing the muscles. It is suggested that a distinction can usefully be made between expiration occurring in "involuntary" natural breathing, such as quiet respiration or asphyxial hyperpnoea, and "voluntary" expiration as in static expiratory efforts or voluntary maximal breathing, or in coughing or straining. (Authors' summary)

1194

Campbell, E. J. M., and J. H. Green 1953a
THE VARIATIONS IN INTRA-ABDOMINAL PRESSURE AND THE ACTIVITY OF THE ABDOMINAL MUSCLES DURING BREATHING: A STUDY IN MAN. — Jour. Physiol. (London), 122 (2): 282-290. 1953. DLC (QP1.J75, v. 122)

Simultaneous recordings were taken of respiration, intra-gastric pressure and the electromyogram of the antero-lateral abdominal musculature in nine healthy young male subjects in the supine posture. During quiet breathing the respiratory variation in intra-gastric pressure was slight; there was no detectable muscular activity. The changes occurring during increasing pulmonary ventilation are described. A level of pulmonary ventilation sufficient for most forms of exercise was attained with relatively slight respiratory variation in intragastric pressure. Maximum voluntary breathing was associated with marked changes in intra-gastric pressure, which rose abruptly at the beginning of expiration and fell abruptly at the beginning of inspiration. The effects of coughing, the vital capacity test and static expiratory efforts are described. (Authors' summary)

1195

Campbell, F. W. 1953
NIGHT MYOPIA AND DAY MYOPIA IN YOUNG SUBJECTS. — Flying Personnel Research Committee (Gt. Brit.). FPRC Report no. 852, Oct. 1953. 2 p. AD 41 105 UNCLASSIFIED

Results of interviews with Professor J. M. Otero at the Institute of Optics, Madrid, are presented and compared with data submitted by members of the Naval Research Laboratory, Optics Division, Washington, D. C., and the Wilmer Institute, Baltimore, Md. "It seems likely that in the majority of young subjects some degree of accommodation occurs after a few minutes in darkness but that the amplitude of the change only rarely exceeds 1 diopter and probably averages about 0.6 D. As the total amount of night myopia (found by subjective measurements) in most subjects is about 1.5 to 2 D, some factor other than accommodation must account for the difference. In view of the comprehensive and careful measurements of Koomen, M. et al. (Jour. Optic. Soc. Amer., 41 (2): 80-90. 1951), it seems reasonable to conclude that spherical aberration accounts for some of the change." (Author's conclusions)

1196

Campbell, F. W., and J. B. deV. Weir. 1953a
THE DEPTH OF FOCUS OF THE HUMAN EYE [Abstract]. — Jour. Physiol. (London), 120 (4): 59P-60P. 1953. DLC (QP1.J75, v. 120)

If the eye is focused for a given distance then an object either nearer or farther away will produce a blurred image on the retina. Within a certain range -- the depth of field -- the eye is unable to detect this blurring. The perception of blurring is related to visual acuity, and thus depth of focus is affected by such factors as brightness and contrast. A table is presented, based on geometric optics, which assumes that the eye can just detect blurring which subtends 1 min. of visual angle. This standard should be regarded as the minimum depth of field and can be expected to be found only under optimal conditions of brightness and contrast. Whatever the standard, the depth of field varies inversely as the pupil diameter and approximately directly as the square of the distance focused. (Abstract, modified)

1197

Campbell, J. T., C. D. Johnson, and T. J. Houston 1953
PREDICTION OF SUCCESS IN RADIO OPERATOR COURSES. — Adjutant General's Office (Army). Personnel Research Branch, Washington, D. C. Research Report no. 995, Feb. 1953. 7 p. (Army Project no. 29535100). AD 7440 UNCLASSIFIED

The Army Classification Battery and the Aptitude Area (AA) scores of 761 men in the courses for intermediate and high-speed radio operators were compared with their final course grades. The Army Radio Code Test was the most effective single predictor, and the AA V was the most effective AA score. Dropping the Pattern Analysis Test from AA V might improve the validity. (AD abstract)

1198

Campbell, P. A. 1953
ATMOSPHERIC CHARACTERISTICS OF GREATEST HUMAN SIGNIFICANCE IN AVIATION OF THE NEXT DECADE. — Aeronaut. Eng. Rev., 12 (4): 50-55. 1953. DLC (TL501.A326, v. 12)

The classical concept of the atmosphere is reviewed briefly and appropriate diagrams are given showing relative altitudes anticipated for civilian and military aircraft during the next ten years. Since almost 75% of the atmospheric bulk and almost all of the weather is present in the troposphere, visual barriers to flight will not be present above the tropopause. However, the tropopause itself varies with season, latitude, weather conditions, and time of day. The jet streams associated with the tropopause are indirectly of biological significance in civilian flight in as much as they shorten travel time and hence allow the intermingling of people before the end of disease incubation periods. --- Consideration is given to other aeromedical problems such as dysbarism, effects of temperature at high altitudes or speeds, and the presence of ozone and cosmic rays, which may occur as a result of civilian flights at 50, 000 ft. or military flights at 100, 000 ft. At present, it seems likely that flights between 60, 000 and 100, 000 ft. will be of such short duration that few biological complications from cosmic radiation will be encountered.

1199

Campbell, P. A. 1953a
ATMOSPHERIC CHARACTERISTICS OF GREATEST HUMAN SIGNIFICANCE IN AVIATION OF THE NEXT DECADE. — Royal Thai Air Force

Med. Gaz. (Bangkok), 2 (5-6): 389-398. 1953. In English. DNLM

Same as the paper, Campbell, P. A., 1953.

1200

Campos, F. D. 1953
[GENERAL ADAPTATION SYNDROME: ADAPTATION DISEASE AND AVIATION] Sindrome geral de adaptação; molestia de adaptação e aviacao. — Revista médica da aeronáutica (Rio de Janeiro), 5 (1): 99-110. 1953. In Portuguese. DNLM (W1. RE609, v. 5)

The principles of the general adaptation syndrome are applied to aviation medicine. Four phases are distinguished: (1) the shock phase, (2) the countershock phase, (3) the adaptation phase, and (4) the exhaustion phase. The alarm or shock phase, referred to as "acute aerial adaptation syndrome" is characterized by hypothermia, hypotension, increase of capillary permeability, hypochloremia, reduction in muscular tone, polyuria, tachycardia, sweating, and sometimes, development of peptic ulcer; airsickness is the true manifestation of this phase. The countershock phase (rise in blood volume, hyperchloremia, hyperglycemia, increase in urinary output) is induced by increased activity of the adrenal cortex. The aviator is often euphoric and is not conscious of any malaise. Frequently the countershock phase is followed by a progressive adaptation to stress, and, in aviation, is referred to as the "chronic aerial adaptation syndrome". During this phase, the aviator who is repeatedly exposed to numerous stresses (anoxia, acceleration, reduced barometric pressure, vibration, etc.) seems to be healthy and composed. This adaptation phase involves an increase in ACTH secretion. Finally, during the exhaustion phase, adaptation wears out, and biochemical changes noted during the alarm phase reappear. A number of fatalities occurred. In 40% of the cases no explanation can be given for sudden death during flight; in 60% of the cases coronary disease and myocardial infarction were responsible for the fatality.

1201

Canfield, A. A. 1953
THE INFLUENCE OF INCREASED POSITIVE G ON REACHING MOVEMENTS. — Jour. Applied Psychol., 37 (3): 230-235. 1953. DLC (BF1.J55, v. 37)

From the results of this experiment, using 48 subjects, certain conclusions about the effect of increased positive radial acceleration on reaching movements may be advanced. Both the speed and accuracy of reaching movements at increased g levels are seriously impaired, the degree of impairment being roughly equivalent to the amount of force imposed. The kinesthetic cues governing the thrust of the arm under normal circumstances are inadequate to maintain similar accuracy or speed under radial accelerative conditions. Due to the increased weight of the arm and the inadequacy of the normal kinesthetic cues, two types of errors are found, one being the negative inertia error and the other the error of downward tendency. The most favorable location of controls for the pilot of high-speed aircraft, both from the standpoint of speed and accuracy, is to the side of the pilot's preferred hand and below its normal resting point. Emergency controls that might have to be manipulated under conditions of increased positive radial acceleration should be no smaller than two inches in diameter if a pushing motion is required. (From the author's summary)

1202

Cara, M., and D. Kohler 1952
[VARIATIONS OF SOME RESPIRATORY CONSTANTS UNDER THE INFLUENCE OF VARIOUS DRUGS IN MAN] Variations de quelques constantes respiratoires sous l'influence de divers agents pharmacodynamiques chez l'homme. — Archives internationales de pharmacodynamie et de thérapie (Paris), 88 (4): 425-433. 1952. In French. DNLM

The effects of various drugs on the respiratory volume were studied in men and women by means of one-hour spirograms. At regular intervals, maximal voluntary apnea, arterial pressure, pulse rate, and oculo-cardiac and oculo-respiratory reflexes were recorded. The minute volume was directly computed from a three-dimensional graphic representation of the resulting data. The drugs tested were adrenaline, ephedrine, acetylcholine, papaverine, atropine, and yohimbine. The results obtained corroborate and render more explicit earlier findings by other methods

1203

Carhart, R., and C. Lightfoot 1953
EFFICIENCY OF IMPAIRED EARS IN NOISE. B. THE DISCRIMINATION OF CHANGES IN INTENSITY. — Sept. 1953. iii+9 p. Northwestern Univ., Evanston, Ill. (Contract AF 33(038)-22645); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-1203-0001, Report no. 5). AD 19 662 • PB 112314

The following findings and conclusions emerge from the analysis of the intensity difference limens (DLs) yielded by normal and hard-of-hearing subjects when tested in quiet and in thermal ("white") noise. — The mean DLs for normal ears became smaller in quiet when the presentation level of the test stimulus was increased, as would be expected from earlier studies. Impaired ears showed a comparable tendency. — Both normal and impaired ears also evidenced reduction of DL size in noise, provided the noise was maintained constant and the presentation level was increased. — However, neither type of ear yielded smaller DLs in noise, as contrasted to the DLs in quiet, when the presentation level was increased to accomodate the threshold shift produced by the noise. In other words, DLs remained roughly equivalent as long as the test stimulus was presented at the same sensation level as the threshold of the moment. — From the practical point of view, the intensity discrimination of impaired ears appears to be as good

in noise as is the intensity discrimination of normal ears. (From the authors' summary)

1204

Carlson, L. D., 1953
H. L. Burns, T. H. Holmes, and P. P. Webb
ADAPTIVE CHANGES DURING EXPOSURE TO COLD. — Univ. of Washington. School of Medicine, Seattle (Contract AF 33(038)422); issued by Arctic Aero Medical Lab., Ladd Air Force Base, Alaska, Feb. 1953. 11 p. (Project no. 22-1301-0002). AD 8242 UNCLASSIFIED

Rectal, deep-muscle, and skin temperatures of five subjects were measured during a 14-day period of exposure to -5° to -17° C. Measurements were also taken of two infantrymen recently returned from field maneuvers. The temperature of hands exposed to -15° C. fell at a slower rate at the end of the study than in the first two days; this suggested a progressive change in the ability to maintain the temperature of extremities. The hand temperature dropped when the upper body was exposed to cold, which suggested the dependence of hand temperature on the total heat loss. Adaptation was thought to involve a maintenance of lower metabolism for a given heat loss and a utilization of more body weight to supply the heat lost by cooling. (AD abstract)

1205

Carpenter, P. D., 1953
and A. J. Nedzel
TOXICITY OF MORPHINE SULFATE IN WHITE MICE UNDER THE INFLUENCE OF POSITIVE PRESSURE. — Jour. Aviation Med., 24 (2): 140-142. 1953. DLC (TL555.A1A4, v. 24)

Administration of morphine sulfate to mice and exposure of these animals to pressures higher than ambient pressure, increases its toxicity. This is probably due to hastened absorption induced by the increased atmospheric pressure. Administration of morphine sulfate to mice with Levophed (vasoconstrictor) delays the toxic action of morphine. This is probably caused by delayed absorption of morphine due to peripheral vasoconstriction following Levophed administration. (Authors' summary)

1206

Carr, C. D., 1953
and B. H. Senturia
FURTHER MICROSCOPIC STUDIES OF THE SECRETIONS OF THE EXTERNAL AUDITORY CANAL. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 33(038)-28643); issued by School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+6 p. (Project no. 21-1601-0006, Report no. 1). AD 14 632 PB 110760

Smears obtained from ear secretions of 153 patients indicated that the cytologic changes on single and serial smears were characteristic of the infection. The categories involved were acute and chronic diffuse, furunculosis, infantile dermatitis, neurogenic type, otomycosis, otitis media, and postoperative fenestration and mastoidectomy. Microscopic and clinical findings suggested a division of acute diffuse external otitis into complicated and uncomplicated subtypes. This simple rapid cytologic method is recommended for the diagnosis and prognosis of the infections of the external and middle ears. Differentiation of middle and external ear infections is frequently possible by the microscopic examination of ear secretion. (AD abstract)

1207

Carson, L. D., 1953
and N. L. Barr
AIR EVACUATION AND TRANSPORTATION OF SICK AND WOUNDED. — In: Roddis, L. H., and J. L. Schwartz. The History of the Medical Department of the United States Navy in World War II, v. 1, p. 203-208. Office of the Surgeon General, (Navy), Washington, D. C., 1953. DLC (D807.U6A53, v. 1)

On the basis of the experience gained during World War II, an immediate need was felt for an aerial evacuation service that could be unified under one central agency. Chances of survival during flight were greatly enhanced when the injured were screened and classified according to conditions at the loading point. It was found that aerial operations required less medical personnel for patient care than evacuation by hospital ship. Furthermore, the morale of patients and combat troops was greatly improved by knowledge of the evacuation system. The disadvantages of an air evacuation service during war time do not outweigh these advantages.

1208

Carter, E. T., 1952
F. S. Grodins, and J. S. Gray
ADDITIVE EFFECT OF CO_2 INHALATION ON EXERCISE HYPERPNEA [Abstract]. — Amer. Jour. Physiol., 171 (3): 713. 1952. DLC (QP1.A5, v. 171)

An attempt was made to decide between two hypotheses concerning the possible mode of action of the direct ventilatory stimulus which operates during moderate exercise. One, the 'multiplicative' hypothesis, holds that the exercise stimulus acts in a multiplicative fashion, i. e. alters the sensitivity of the respiratory center to the arterial chemical agents, CO_2 and H-ion, while the other, the 'additive' hypothesis, holds that the exercise stimulus acts in addition to these agents without altering their sensitivity coefficients. Either successfully accounts for the response to CO_2 inhalation at rest as well as for the exercise response while breathing air, but they predict widely different behavior during a combination of the two. Utilizing the multiple factor theory of Gray, the additive hypothesis predicts that the ventilation equivalent for CO_2 should fall with increasing oxygen consumption when breathing a given concentration of CO_2. In contrast, the multiplicative hypothesis predicts that this quantity should remain constant. Ventilation and gas exchange were determined in six subjects in the ventilatory steady

state during CO_2 inhalation, during exercise and during a combination of the two. It was observed in all subjects that when CO_2 was inspired during increased levels of oxygen consumption, there was a significant fall in the ventilation equivalent for CO_2. This supports the additive hypothesis of the mode of action of the exercise stimulus and militates against the 'altered sensitivity' hypothesis. (Complete abstract)

1209

Case, H. W., 1953
G. E. Mount, J. W. Sanderson, and R. Brenner
DISTANCE JUDGMENT OF COLORED OBJECTS [Abstract]. — Amer. Psychologist, 8 (8): 330-331. 1953. DLC (BF1. A55, v. 8)

Tests were carried out to investigate the effect of color on judgments of relative distance in outdoor situations. Eight comparison cards were used, including a highly saturated red, green, yellow, and blue; and four grays, each matched in brightness to one of four hues. Two standards were used, either a high-bright or medium-bright card, each located 200 feet from the subject. A comparison was placed at one of eight different distances from 192 to 220 feet from the subject. Each of 168 subjects made 128 judgments as to which was closer, the standard or comparison. Half of the subjects made their judgments against the high-bright gray standard and half against the medium-bright gray standard. All comparisons were seen in front of the darker standard more often than in front of the brighter standard. Similarly, each hue was seen in front of its matching gray. The effect of brightness appears to depend in part upon a contrast relationship to the background. Comparison grays of both high and low brightness were consistently seen in front of the two medium brightness comparison grays; this suggests that objects only slightly discernible from their background will be judged at a position of nearer coincidence with the background than more greatly contrasting objects. (Authors' abstract, modified)

1210

Célice, J., 1953
F. Plas, J. Himbert, and J. Bourdinaud
[EXAMINATION OF THE RIGHT HEART BY THE CONTROLLED EXPIRATORY HYPERPRESSURE TEST] Exploration du coeur droit par le test d'hyperpression expiratoire contrôlée. — Médecine aéronautique (Paris), 8 (1): 23-26. 1953. In French. DLC (TL555.M394, v. 8)

A test is described called the "expiratory hyperpressure test" (EHT), which is based on the Valsalva maneuver (forced expiration with closed glottis) and has certain advantages of the Flack or endurance test (determination of pulse changes during expiration against a pressure of 40 mm. Hg). The EHT analyzes the electrocardiographic changes during a prolonged (50 seconds to 2 minutes) Valsalva maneuver. The forced expiration brings about an increase in the blood pressure in the right heart by an amount of 25-45 cm. water (maximum, 70 cm.) in the right auricle and by 9-50 cm. (maximum, 68 cm.) in the right ventricle. The pulse rate during the test generally increases and extrasystolic contractions are frequently observed. If these extrasystoles continue after the conclusion of the test, they indicate cardiac pathology. The right-heart hypertension results in an alteration of the P2 wave in the electrocardiogram 4-10 seconds after the beginning of the tests which disappears again towards the conclusion of the test; if it begins immediately or persists longer, it indicates chronic pulmonary pathology. The test is recommended to be applied in the physical examination of aviation cadets.

1211

Chalmers, E. L. 1952
MONOCULAR AND BINOCULAR CUES IN THE PERCEPTION OF SIZE AND DISTANCE. — Amer. Jour. Psychol., 65 (3): 415-423. 1952. DLC (BF1. A5, v. 65)

An apparatus was designed to make monocular and binocular depth perception measurements excluding secondary cues. The observer was requested to match the sizes of two variable comparison triangles, placed at 10 ft. and 120 ft. from the observer, against the apparent sizes of standard triangles of varying actual size, placed at distances between 10 and 120 ft. All triangular stimuli consisted of cutouts through which an illuminated surface in the rear was viewed. Monocular vision provided no information as to size or distance of test objects beyond about 25 ft. In binocular vision, the added cues provided by binocular convergence and retinal disparity (as a result of simultaneous stimulation by the standard and comparison triangles) enabled the test subjects to effect proper matches of the 10-foot-distant comparison triangle with standard triangles up to 50 ft. distance. Beyond this distance the binocular cues, not supplemented by secondary cues, were no longer adequate.

1212

Chambert, S. 1953
[DESCENT IN PARACHUTE WITHOUT RELEASING THE EJECTION SEAT] Descente en parachute sans largage du siege. — Médecine aéronautique (Paris), 8 (4): 359-362. 1953. In French. DLC (TL555.M394, v. 8)

A double accident due to low bailout is discussed. Before the first pilot had a chance to release the canopy remover, the seat was catapulted; the parachute opened rather slowly, and the wind blew the pilot against a wall. In the second plane, the pilot failed to release the ejection seat and was hanging with his head down. When the ejection seat launching mechanism fired, the pilot clung to a tree. He suffered from shock and was taken to the hospital where the following conditions were diagnosed: compound fracture of the lower portion of the right forearm; detachment of the styloid process from its base; subcutaneous lesions of the left foot and left leg extending to the exterior tibial tuberosity with emphysema around the wound; small fracture of the left heel bone, fracture of

the right radius; and hematoma of the left carotid region. It was concluded that the accident was caused by technical failure. Instead of pulling the handle of the ejection seat, the pilot grabbed the arm brace of the seat. When he tried to open the parachute, he realized that the seat was not released and got entangled with the parachute. — There are only a few instances known when a pilot was able to parachute to safety without the ejection seat being released. When opening the canopy, eye glasses, helmet and the mask frequently get lost. As a preventive measure, pilots prefer to fasten the oxygen supply tube to the parachute belt, so that it should be accessible when needed.

1213

Chapanis, A. 1953
SOME CONTRIBUTIONS OF EXPERIMENTAL PSYCHOLOGY TO MACHINE DESIGN. — Eighth Annual Time Study and Methods Conference Proc., p. 67-82. Society for Advancement of Management, Inc., New York, 1953.
Reprint issued also as: Johns Hopkins Univ., Baltimore, Md. Report no. 166-1-174, [1953]. (Contract N5ori-166, Task Order 1). AD 26 275
UNCLASSIFIED

Recent studies on human engineering are reviewed and findings summarized, with special consideration of problems encountered by the airplane pilot. Some of the conclusions drawn are as follows: (1) Statistical evidence points toward a relatively high proportion, about one third, of error in reading or interpreting instruments detecting signals, or understanding instructions. (2) The largest proportion of pilot error is attributable to confusion of controls. (3) A comparison of five different types of dials (vertical, horizontal, semicircular, open window, and round), revealed fewest errors in the open-window type, the round dial was next best, and the horizontal and vertical dials were poorest. (4) Scales are easiest to read if the numbering is given in multiples of 1, 10, 100, etc. (5) Multiple revolution dials ("gas meter type") rate among the worst in terms of legibility. (6) Direct-reading counters merit preference to all other types. And (7) direction of switches and levers should follow accustomed and logical patterns (clockwise for increases, up and down movements for corresponding navigational directions).

1214

Chapanis, A. 1953a
PSYCHOLOGY AND THE INSTRUMENT PANEL. — Scient. Amer. 188 (4): 74-82. 1953.
DLC (T1.S5, v. 188)

An Air Force survey showed that one of the most common causes of accidents is misreading of panel instruments. Noteworthy also are accidents caused by the fact that the controls differ in position in various models of craft or are too closely spaced though opposite in purpose. In order to minimize aircraft accidents because of human error, psychological testing of air personnel should be required to establish the human factors involved in instrument reading. The information gained from preliminary psychological tests implies that panel design should be as simple as possible for increased readability. An indicator should convey the type of information needed and switches should be designed so that the response of the pilot will be consistent with the desired action. Cockpit and panel illumination should be adequate. All dials should be designed to show a small range of pertinent information, and all units of measure should be in tenths for the speediest interpretation of information.

1215

Charles, J. P. 1953
FRACTURED VERTEBRAE IN U. S. NAVY ACCIDENTS. — Jour. Aviation Med., 24 (6): 483-490. 1953. DLC (TL555.A1A4, v. 24)

The fractured vertebrae sustained in U. S. Navy aircraft accidents involving pilots only were reviewed over the five year period from January, 1948. The causal factor in fractures other than compression fractures of the lumbar and thoracic was clear. Transverse process fractures generally followed violent swerving or cartwheeling during a forced landing. Cervical fractures of all types most frequently involved nose overs followed by acute flexion of the neck. The majority of cases were compression fractures of the lower thoracic and upper lumbar vertebrae. In general the aircraft either stalled or mushed into the ground or struck an embankment in a nose-high altitude during the initial part of the slide. The evidence appears to indicate that vertical forces acting through the seat bottom rather than acute flexion of the spinal column are causing the compression fractures of the thoracic and lumbar vertebrae. (From the author's summary)

1216

Chatelain, E. 1953
[PREDOMINANCE OF THE PSYCHIC FACTOR IN NEUROVEGETATIVE DISORDERS OBSERVED IN MILITARY AVIATION MEDICINE] Prédominance du facteur psychique dans les troubles neuro-végétatifs observés en médecine aéronautique militaire. — Monatsschrift für Psychiatrie und Neurologie (Basel), 125: 85-103. 1953. In French.
DNLM

The importance of the psychic factors in the etiology of pathological conditions developing during flight is stressed. The reciprocal nature of these factors sets off a series of vicious circles. Yet, the psychic component passes often unnoticed. The case of a flight observer is described who suffered from motion sickness on every flight. Nevertheless, he was promoted to captain, and finally became a jet pilot. From the first day of his pilot training on, he was permanently cured of any trace of nausea, even during stunt flight maneuvers. In another case, a sudden severe hypoxic syndrome during high-altitude flight with the oxygen equipment in good working condition, was revealed to be purely psychosomatic; elimination of matrimonial difficulties, and psychoanalytic treatment produced a complete cure. It is believed that psychic factors have too long been neglected in the search for the etiology and pathogenesis of

motion sickness. Conditioning factors, such as odor and color, form the link between somatic and psychic disturbances. The flight surgeon must take into consideration all possible somatic and psychic causes to forestall the possibility of neurosis.

1217

Cheatham, P. G. 1952
THE MEASUREMENT OF VISUAL PERCEPTUAL LATENCY AS AN INDEX OF RETINAL INTERACTION EFFECTS IN THE HUMAN FOVEA [Abstract].— Amer. Psychologist, 7 (9): 524. 1952. DLC (BF1.A55, v. 7)

Perceptual latency was measured for three trained subjects by the masking method, under five conditions designed to produce foveal summation or inhibition. Only summation occurred as indicated by a significant shortening of perceptual latency. Significant inhibition was not produced. Perceptual latency measurements provide a sensitive index of the temporal characteristics of retinal activity. (Entire abstract)

1218

Cheatham, P. G. 1952a
VISUAL PERCEPTUAL LATENCY AS A FUNCTION OF STIMULUS BRIGHTNESS AND CONTOUR SHAPE. — Jour. Exper. Psychol., 43 (5): 369-379. 1952. DLC (BF1.J6, v. 43)

In these studies, perceptual latency and perceptual development time were measured as a function of changes in the brightness and contour shape of the stimulus, consisting of projected images. Measurement was by the method of masking with a light flash of high intensity, which gave values of relative perceptual latency, obtained in the subject independently of any motor reaction time. An inverse relationship was found between the test stimulus brightness and the perceptual latency for that stimulus. Perceptual latencies did not, in general, vary significantly with variations in the stimulus contour. The data did not support the hypothesis that the more angular figures would have shorter latencies. Actually, angles and angular figures had the longest latencies. Development time, measured as that time required for the complete development of the contour, was inversely related to stimulus brightness. Unlike latency, it did vary significantly with changes in contour shape. During the developmental period, the contour passed through an orderly sequence. A small portion appeared first, then increased in size, and finally became complete. Sides appeared before angles. (Author's abstract, modified)

1219

(Chem. Corps Med. Labs.) 1953
CONFERENCE ON ARTIFICIAL RESPIRATION. — Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19, April 1953. ii+92+27 p. AD 9582. PB 109598

Proceedings of a conference on artificial respiration held at the Medical Laboratories of the Army Chemical Center, on December 9-10, 1952.

The following papers have been abstracted separately:

Elam, J. O., 1953
Hitchcock, F. A., 1953
Moore, J. C., 1953
Radford, E. P., 1953
Whittenberger, J. L., 1953
Wilks, S. S., 1953

1220

Cherry, E. C. 1953
SOME EXPERIMENTS ON THE RECOGNITION OF SPEECH, WITH ONE AND WITH TWO EARS. — Jour. Acoust. Soc. America, 25 (5): 975-979. 1953. DLC (QC221.A4, v. 25)

Also issued as: Massachusetts Inst. of Technology. Research Lab. of Electronics, Cambridge [Contract DA 36-039-sc-100]. AD 26 317 UNCLASSIFIED

The tests described in this paper were divided into two groups: In the first, two different spoken messages were presented through earphones to the subject simultaneously, using both ears. In the second, one spoken message was fed to his right ear and the other message to his left ear. The following experimental variations were used: (1) The subject was presented with two mixed speeches (recorded on tape) and asked to repeat one of them; this task was accomplished with great difficulty. (2) One continuous spoken message was fed into a headphone on the subject's left ear and a different message applied to the right ear; no difficulty was experienced in listening to either speech at will and rejecting the unwanted one. (3) The latter test was repeated starting in English and switching the "unwanted" message over into German; the language switch was not clearly recognized. And (4) similar messages were received in the two ears, but with time delay between them, which was steadily reduced as the message proceeded; the words were recognized as the delay was reduced, with subjective variances as to extent of delay at the point of recognition (between 2 to 6 seconds).

1221

Cheymol, J., 1953
and C. Levassort
[CHLORPROMAZINE AND RESISTANCE TO HYPOXIA] Chloropromazine et résistance à l'hypoxie. — Bulletin de la Société de chimie biologique (Paris), 35 (8): 831-836. 1953. In French. DLC (QD1.S47, v. 35)

The effect of chlorpromazine on hypoxia was studied on 100 rats and 50 guinea pigs. Chlorpromazine has a hypothermic action and diminishes oxygen consumption by decreasing the metabolism. Doses inducing a temperature decrease of 3.9°C. in rats and 2.7°C. in guinea pigs after 1-6 hours were injected subcutaneously or intraperitoneally, and the animals kept at a simulated altitude of 11,000 m., after an elevation at the rate of 1000 m./2 min. The animals which had received chlorpromazine died much quicker than the controls.

This is explained by the assumption that the chemoreceptors are blocked by chlorpromazine, preventing their reflex action increase of ventilation but maintaining their direct central depressive action during hypoxia. It is remarked that such a complex phenomenon as the resistance to hypoxia cannot be reduced to purely physical processes and that the role of the nervous system should not be minimized.

1222

(Chicago Univ.) 1953
BENOX REPORT: AN EXPLORATORY STUDY OF THE BIOLOGICAL EFFECTS OF NOISE. — Univ. of Chicago, Ill. Dec. 1, 1953. v+116 p. (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

A literature survey and preliminary experiments were undertaken to determine a course of action which would allow effective performance at high-intensity noise levels. An educational campaign advocating the use of insert-type ear defenders for exposed personnel was recommended; the V-51-R ear defenders are considered to provide reasonable protection from presently encountered high-noise levels. The development of better visual communication systems and of training programs to teach visual communication in noise is an urgent need. Areas of needed research on the effects of high-intensity noise are also discussed. The project became known as "Benox" (Biological Effects of Noise Exploratory). (AD abstract, modified)

The following papers contained in this volume have been abstracted separately:

Ades, H. W., 1953
Davis, H., 1953
Gierke, H. E. von, 1953, 1953a
Halstead, W. C., 1953
Miles, W. R., 1953
Neff, W. D., 1953, 1953a
Rudnick, I., 1953
Ward, A. A., 1953

1223

Chinn, H. I., 1953
B. A. Strickland, O. H. Waltrip, and J. D. McGeary
EFFECTIVENESS OF VARIOUS DRUGS IN PREVENTION OF AIRSICKNESS: STUDIES DURING ROUTINE TRAINING FLIGHTS. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+3 p. (Project no. 21-1208-0012, Report no. 1). AD 19 664 PB 112073

A mixture of 25 mg. of benadryl and 0.35 mg. of scopolamine hydrobromide gave good protection against motion sickness both with and without the addition of 5 mg. of dexedrine sulfate. No significant difference in prophylaxis between the two groups of subjects were detected. The following preparations failed to afford significant protection: Parsidol hydrochloride (25 mg.); Wyeth formula No. 46062 (25 mg.), Schering formula No. 1667, and Wyeth formula No. 46062 (15 mg.) plus scopolamine hydrobromide (0.35 mg.). The side effects were slight. The significance of adding dexedrine sulfate to combat the sedative effects of motion sickness preventives is discussed, and it is shown that dexedrine sulfate added to a benadryl-scopolamine hydrobromide mixture actually decreased the job performance of air navigation students. Because such a stimulation did not noticeably impair the capacity of the original preparation to prevent airsickness there is hope that a better protective mixture may be evolved. (Authors' summary)

1224

Chinn, H. I., 1953a
A. J. Dugi, and L. J. Milch
EFFECTIVENESS OF VARIOUS DRUGS IN PREVENTION OF AIRSICKNESS: COMPARISON OF SCOPOLAMINE, POSTAFENE, AND PHENERGAN. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+2 p. (Project no. 21-1208-0012, Report no. 2). AD 19 665 PB 112074

Scopolamine (1.0 mg.) affords greater protection against airsickness than Postafene (25 mg.) or Phenergan (25 mg.), both of which, however, signicantly lower the incidence of airsickness. — Postafene protects for at least 24 hours after oral administration. — The side effects produced by these drugs were slight, the most significant being an increased incidence of dry mouth after scopolamine. (Authors' summary and conclusions)

1225

Chinn, H. I., 1953b
and N. P. Plotnikoff
EVALUATION OF VARIOUS TECHNIQUES FOR SCREENING ANTIMOTION SICKNESS DRUGS. — Jour. Applied Physiol., 5 (8): 392-394. 1953. DLC (QP1.J72, v. 5)

Same as the report, Chinn, H. I., 1952d.

1226

Chinn, H. I., 1953c
W. R. Gammon, and M. E. Frantz
PREVENTION OF AIRSICKNESS AMONG AIRBORNE TROOPS. — Jour. Applied Physiol., 5 (10): 599-602. 1953. DLC (QP1.J72, v. 5)

Same as the report, Chinn, 1952e.

1227

Chinn, H. I., 1953d
L. J. Milch, and A. J. Dugi
COMPARISON OF VARIOUS DRUGS AGAINST AIRSICKNESS. — Jour. Applied Physiol., 6 (4): 257-259. 1953. DLC (QP1.J72, v. 6)

Scopolamine (1.0 mg.) affords greater protection against airsickness than Postafene (25 mg.) or Phenergan (25 mg.), both of which, however, significantly lower the incidence of airsickness. Postafene protects for at least 24 hours after oral administration. The side effects produced by these drugs were slight, the most significant being an increased incidence of dry mouth after scopolamine. (Authors' summary)

1228

Chinn, H. I., 1953e
B. A. Strickland, O. H. Waltrip, and J. D. McGeary
PREVENTION OF AIRSICKNESS DURING TRAINING FLIGHTS. — U. S. Armed Forces Med. Jour., 4 (11): 1609-1612. 1953.
DLC (RC970.U7, v. 4)

Same as the report, Chinn, H. I., 1953

1229

Christensen, P. R., 1952
J. P. Guilford, R. F. Green, and N. W. Kettner
A FACTOR-ANALYTIC STUDY OF NAVY REASONING TESTS WITH THE AIR FORCE AIRCREW CLASSIFICATION BATTERY. [Abstract]. — Amer. Psychologist, 7 (9): 519. 1952. DLC (BF1.A55, v. 7)

A condensation of the report, Guilford, J. P., 1952.

1230

Christenson, C. M. 1953
VIEWPOINT OF THE COMMERCIAL TRANSPORT PILOT. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 55-61. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Human tolerance limits are being approached in modern-day flight. Hence, the human factor must be a primary consideration in the selection of commercial transport pilots. Pilot training, aircraft design, air traffic control, and landing techniques and facilities are additional factors to be considered in bringing about successful and safe high-altitude and high-speed flight.

1231

Christner, C. A., 1953
and J. K. Hemphill
STUDIES IN AIRCREW COMPOSITION. V: CHANGES IN B-29 CREW MEMBERS' ATTITUDES TOWARD THE CREW DURING THE INITIAL PERIOD OF CREW ASSEMBLY. — Ohio State Univ. Personnel Research Board, Columbus (Contracts AF 33(038)-10105 and AF 18(600)-27); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. Technical Report no. 5, Nov. 15, 1953. vii+68 p.
AD 121 652 UNCLASSIFIED

Ten rating scale items, each measuring an attitude toward crews or crew members, were administered to the members of 52 newly assembled B-29 crews at the beginning and end of a 10-day interval. Camparison of attitude scores before and after training indicates that ratings of crew morale and willingness to remain with the crew are lower after crew training. Attitudes toward individual crew members become more favorable on such items as friendship, proficiency, and confidence. An analysis of officer-airman differences indicates that officers assign higher ratings to officers than to airmen; and that, on items pertaining to the performance of duties, airmen also assign higher ratings to officers. Attitude change scores indicate that both officers and airmen tend to rate each other higher after training. There is a significant correlation between radar bombing scores and changes in the ratings of the proficiency of individual crew members. Group dimension scores are significantly related to attitude scores both before and after training. The impact of the aircraft commander's leadership is indicated by significant relationships between both leader behavior dimension scores and changes in such attitudes as friendship, willingness to go to combat, and confidence in other crew members. (From the authors' abstract)

1232

Churchill, E., 1953
and G. S. Daniels
NOMOGRAPHS OF HEAD MEASUREMENTS. — Antioch Coll., Yellow Springs, Ohio (Contract AF 18(600)-30); and Wright Air Development Center. Aeromedical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-14, May 1953. iv+26 p. (RDO no. 695-71). AD 16 748
PB 111605

To achieve the optimum design of equipment intended to fit the wearer's head closely, a knowledge of the interrelationships between the more important head dimensions is necessary. This report provides such information in the form of two nomographs for determining the most accurate estimate for each of twelve head dimensions based on known values of head length and head breadth, and head breadth and head circumference. (Authors' abstract, modified)

The results are based on values obtained on more than 4000 Air Force flying personnel.

1233

Cibis, P. A., 1953
S. J. Gerathewohl, and D. Rubinstein
DEPTH PERCEPTION IN MONOCULAR AND BINOCULAR VISION. — School of Aviation Medicine, Pensacola, Fla. Special Report, Jan. 1953. 12 p. AD 3220 PB 109069

Plain white squares, squares with vertical stripes, and squares with horizontal stripes were viewed by 31 subjects who judged the apparent plane slant from a distance of 3 m. The perspective cues, especially horizontal stripes, were the most effective, followed by the stereoptic cues. However, the combined effect of the stereopsis and any strong perspective cue was less than the sum of the effects of each taken independently. Motion in conjunction with weak cues inhibited depth perception; it enhanced the effect of strong cues. (AD abstract)

1234

Clamann, H. G. 1952a
PNEUMATIC REFRACTOMETER: A CONTINUOUS

FAST RECORDING GAS ANALYZER. — Federation Proceedings, 11(1[I]): 25. 1952.
DLC (QH301. F37, v. 11)

A new principle has been applied to obtain fast recordings of changes in composition of gas mixtures as they occur in respiration. The refractive index (r.i.) of a gas is proportional to its density, or in a mixture of gases with different r.i., to its concentration. To obtain refraction of a light beam, the gas to be analyzed has to form a plane surface to a reference gas of another optical density. A constant flow of the reference gas through the analyzing cell in the shape of a Venturi tube provides suction to a slit-like jet nozzle. The analyzed gas then enters the cell through this nozzle in form of a well defined small band, imbedded in the reference gas. A light beam from a single filament lamp traverses the analyzing cell, directed by 2 cylindric lenses as windows, and finally forms an image on the screen. The light beam passing from the reference gas into the analyzed gas is refracted and therefore more or less spread out, thus changing the brightness of the image. These changes are transmitted by a photocell to a recording device. In respiration studies, concentration of carbon dioxide can be measured during a single breath. (From the author's abstract)

1235

Clark, B., 1952e
and A. Graybiel
A DEVICE TO MANIPULATE AND TO INDICATE THE POSITION OF REMOTE TEST—OBJECTS. — Amer. Jour. Psychol., 65 (2): 286-287. 1952.
DLC (BF1. A5, v. 65)

A device designed to study visual space perception is described, which makes it possible for the test subject and the experimenter to control a distant test object (by means of two three-way switches) independently, and at the same time to have an accurate record of the position of the target. The basic parts of the apparatus consist of: (1) a Navy Mark II collimator consisting of a luminous target placed at infinity by means of an optical system and viewed by the subject through a circular opening; (2) a pair of "selsyn" (self-synchronous) repeater motors (one geared to the target, and the other to a recording device); and (3) a motor which controls the rotating target. The advantages of this device are the following: (1) any object placed in optical infinity can be observed in a relatively restricted area; (2) the rotary motion of a remote object can be reproduced with high fidelity; (3) both the test subject and the experimenter can control the settings of the test target regardless of the distance between them; and (4) an automatic recording is feasible.

1236

Clark, B., 1953
and W. Johnson
PREVIOUS EDUCATION AND AGE AS RELATED TO GRADES IN THE U.S. NAVAL SCHOOL, PRE-FLIGHT. — Naval School of Aviation Medicine, Pensacola, Fla. March 3, 1953. 5+6 p. (Project Report no. NM 001 058.25.01). AD 12 324
UNCLASSIFIED

The relation of age and previous education to performance in preflight school was determined for 2091 cadets. The performance of cadets with only high-school education, selected by General Educational Development (GED) tests, was not significantly different from the performance of college graduates, except for the superiority of the college group in physical training. The high-school group, the GED group, and the college graduates were all superior to those with incomplete college training; the main areas of high-school and GED superiority were in aerology, engines, and naval orientation. No age-performance relationship existed among the cadets completing the preflight school, but a critical ratio of 1.94 was obtained with respect to the age of cadets who failed or voluntarily withdrew (a mean of 22.51 years) and those who completed the course (22.08 years). Cadets with a high-school education are considered capable of completing the course if they are properly motivated. (AD abstract)

1237

Clark, B., 1953a
M. A. Nicholson, and A. Graybiel.
"FASCINATION:" A CAUSE OF PILOT ERROR. — Naval School of Aviation Medicine, Pensacola, Fla. May 15, 1953. 13+5 p. (Project Report no. NM 001 059. 01.35). AD 17 604 UNCLASSIFIED

"Fascination" is defined as a condition in which the pilot fails to respond adequately to a clearly defined stimulus situation in spite of the fact that all of the necessary cues are present and the proper response is well-known to him. The occurrence of fascination was studied in 502 Naval Flight Students, using a questionnaire which asked them to write a description of an experience with fascination and mark a check list of such experiences. In addition, 25 flight instructors were interviewed regarding their observations of fascination in their students. Fascination was found to be well-known to both instructors and students. 39% of the Advanced Students and 88% of the Basic Students indicated that they had experienced it in one form or another. Fascination appeared to be fundamentally a matter of heightened attention but some experiences also included compulsive types of behavior and blocking. A positive but not significant relationship was found between the number of fascination experiences marked on the check list and the number of unsatisfactory flights and the number of accidents and near accidents reported. The written reports indicate that fascination occurs in all types of flight and should be considered to be a normal phenomenon which can be reduced by the use of proper procedures. (Authors' summary)

1238

Clark, B., 1953b
and M. A. Nicholson
AVIATORS' VERTIGO: A CAUSE OF PILOT ERROR IN NAVAL AVIATION STUDENTS. —

Naval School of Aviation Medicine, Pensacola, Fla. Aug. 12, 1953. 10+vi p. (Project Report no. NM 001 059.01.37). AD 19 385 UNCLASSIFIED

A questionnaire concerning student pilots' experiences with disorientation was administered to 226 basic students and 276 advanced students in the Naval Air Training Command. The first part of the questionnaire asked the students to write descriptions of specific flight experiences, while the second part of the questionnaire consisted of a check list of pilots' experience with disorientation. The major analysis was based on the responses to the check list. In this analysis it was found that every "vertigo" (mistaken perception) item was marked by at least one student. The item marked by the greatest number of students (62%) was, "... an apparent turning when the instruments indicated straight and level". The data revealed that the most common type of vertigo experienced by student pilots involved confusions with regard to attitude and position of the aircraft, although confusions with regard to visual perception were also common. These data are convincing evidence that vertigo is experienced sooner or later by student pilots in their training and that there is a close relationship between vertigo and aviation safety.

1239

Clark, B., 1953c
M. A. Nicholson, and A. Graybiel
FASCINATION: A CAUSE OF PILOT ERROR. — Jour. Aviation Med., 24 (5): 429-440. 1953.
DLC (TL555.A1A4, v. 24)

Same as the paper, Clark, B., 1953a

1240

Clark, L. C., 1953
R. Wolf, D. Granger, and Z. Taylor
CONTINUOUS RECORDING OF BLOOD OXYGEN TENSIONS BY POLAROGRAPHY. — Jour. Applied Physiol., 6 (3): 189-193. 1953.
DLC (QP1.J72, v. 6)

A shiny platinum cathode covered with a layer of cellophane has been found to be suitable for the direct measurement of oxygen tension in whole blood by polarographic procedures. The cellophane covering prevents the undesirable effects of the red cells which interfere with oxygen tension measurements using a bare platinum electrode, and in addition nearly abolishes the "stirring effect." A tiny cathode of this type (2 mm. diameter and 8 mm. long) mounted on a catheter can be passed into the major blood vessels and the chambers of the heart, for continuous recording of oxygen tension. Such cathodes are easily calibrated and are stable, reproducible and sensitive. (Authors' summary)

1241

Clark, R. T., 1953
H. I. Chinn, J. P. Ellis, N. E. R. Pawel, and D. Criscuolo
TISSUE RESPIRATORY STUDIES DURING CHRONIC ALTITUDE AND COLD EXPOSURE. — School of Aviation Medicine, Randolph Field, Tex. Dec. 1953. iii+5 p. (Project no. 21-1201-0009, Report no. 3). AD 30 034 PB 113753

Rats were exposed to a simulated altitude of 18,000 feet, kept at this altitude for 30 days, and sacrificed. The liver was removed while the heart was still beating and was prepared for tissue respiratory studies. The oxygen uptake of liver slices was determined in 100% oxygen using beta-glycerophosphate (a process developed by R. W. You and E. A. Sellers, cf. Endocrinology, 49 (3): 374-378. 1951). A slight but significant decrease in oxygen uptake was found in the altitude-exposed rats. Under similar experimental conditions the respiration of liver slices extracted from a group of rats exposed to low temperatures was markedly increased. In a third group of tests, the oxygen uptake of liver slices extracted from rats exercised on a treadmill at ground level was compared with that from exercised and nonexercised rats maintained at 18,000 feet for 35 to 38 days. Liver slices from the exercised, altitude-exposed rats had a significantly lower oxygen uptake than did slices from control animals similarly exercised. Respiratory enzyme (cyclophorase) activity of liver and kidney was determined in cold-exposed rats, and of liver, kidney, diaphragm, heart, soleus muscle, gastrocnemius muscle, and brain of altitude-exposed animals. Only the activity of the diaphragm was significantly higher after exposure. (Authors' summary, modified)

1242

Clemedson, C. J., 1953
and H. Pettersson
GENESIS OF RESPIRATORY AND CIRCULATORY CHANGES IN BLAST INJURY. — Amer. Jour. Physiol., 174 (2): 316-320. 1953.
DLC (QP1.A5, v. 174)

By protecting the bodies of the experimental animals with the exception of their heads and by previous bilateral vagotomy and anesthesia of the carotid sinus region, it has been possible to determine the origin of the respiratory and circulatory changes in rabbits exposed to the shock waves from a detonating high explosive. These experiments led to the following conclusions: The changes in respiration and circulation are entirely or almost entirely of peripheral origin. Usually there seems to be no cerebral-concussion component in the blast syndrome. The instantaneous acceleration of respiration is solely due to vagal reflexes elicited in the damaged lungs. Change in circulation is of a two-fold origin. The initiation of the bradycardia and the blood-pressure fall seem to be caused by the blast pressure acting externally on the carotid-sinus region. The more prolonged effects, on the other hand, are due to reflexes evoked in the damaged lungs. This is especially marked as far as blood pressure is concerned.

1243

Clemedson, C. J., 1953a
H. Hultman, and B. Grönberg
RESPIRATION AND PULMONARY GAS EXCHANGE

IN BLAST INJURY. — Jour. Applied Physiol., 6 (4): 213-220. 1953. DLC (QP1.J72, v. 6)

Pulmonary ventilation and gas exchange capacity in blast injury were studied in urethane-anesthetized rabbits which had been exposed to high-explosive shock waves in a detonation chamber. In slight as well as in severe lung-blast injury the respiratory minute volume usually is considerably increased, and in lethally injured animals the hyperventilation is generally maintained until just before death. The oxygen consumption will at first decrease a little, but then it increases gradually except in lethally injured animals, where it is greatly lowered from the very beginning after the exposure. The arterial oxygen saturation rapidly declines after the explosion in both slightly and severely injured rabbits but it can, in the early phase, usually be normalized by having the animal breathe pure oxygen. In slightly injured animals there is an increased carbon dioxide elimination and a shift to alkalinity in the arterial blood. Severe lung blast injury on the other hand causes a decrease in carbon dioxide elimination and lowering of the blood pH.

1244

Clements, J. A., 1952
and J. C. Moore
METHOD FOR CONTINUOUS INDICATION OF OXYGEN TENSION IN FLOWING BLOOD [Abstract]. — Amer. Jour. Physiol., 171 (3): 713-714. 1952. DLC (QP1.A5, v. 171)

A method has been developed for continuous estimation of oxygen tension in moving fluids such as Ringer's solution, plasma and whole blood. A vibrating mercury electrode is used in an otherwise conventional polarograph with the result that the electrolysis current at fixed applied voltage is a linear function of pO_2. In this respect it differs from the conventional dropping mercury electrode, which develops a 'diffusion current' linearly related to oxygen content, if pH, hematocrit, and temperature are constant. It has been shown that changes in these factors that are within the ranges commonly encountered in experimental animals do not significantly alter the electrolysis current at constant pO_2. The effects of larger changes are discussed. This method (indicating pO_2 in flowing arterial blood) in conjunction with 'continuous' analysis of alveolar pO_2 by end-expiratory sampling of gas from the tracheal bifurcation can be used to follow rapid changes in A-A gradient. Its uses in several other types of experiments are discussed. (Complete abstract)

1245

Clements, R., 1953
J. W. Archer, R. Hays, J. K. Schoening, P. L. Ewing, and G. A. Emerson
THE EFFECTS OF CHLOROQUINE ON THE SPEED OF VISUAL ACCOMMODATION IN MAN. — Univ. of Texas Medical Branch, Galveston (Contract AF 41-(607) 44); issued by School of Aviation Medicine, Randolph Field, Tex., Nov. 1953. iii+7 p. (Project no. 21-1601-0005). AD 25 827 PB 113485

Despite previously reported visual disturbances after chloroquine administration, acute experiments with amebacidal and malarial therapeutic doses and suppressive doses for a period of one year failed to cause significant changes in time of visual accommodation, as measured with the tachistoscope. Even in doses several times the usual therapeutic amounts, no changes in blood pressure or cerebral blood flow were recorded in animal experimentation. Under the conditions of these tests any indication of change in time of visual accomodation is felt to be questionable. (Authors' summary)

1246

Cloonan, T. F., 1953
D. G. Forgays, and B. Spilka
GROUP EFFECTIVENESS IN BOMBER CREWS: ANALYSIS OF IN-FLIGHT PROCEDURES AS A CRITERION SOURCE [Abstract]. — Amer. Psychologist, 8 (8): 333-334. 1953. DLC (BF1.A55, v. 8)

Recordings of interphone communications occurring during typical training flights were obtained from 50 B-29 crews to identify procedures occurring during the radar bombing portions of the missions. Once identified, several procedural index scores, based on the total number of such procedures occurring, their sequence, etc., were calculated, and then related to external criterion measures including bomb scores, navigational accuracy scores, and instructor ratings. Reliability studies indicate that various procedural-index scores, as well as the actual occurrence of procedures, are sufficiently reliable to be useful for research purposes. Significant relationships were found between various procedural-index scores and external criterion measures. Results support the view that adequate criterion analysis should be concerned not only with the obvious end products of the performance of a group, but as well with the sequence of events constituting that performance. (Authors' abstract, modified)

1247

Coakley, J. D., 1953
and J. T. Fucigna
A HUMAN ENGINEERING REVIEW OF THE HEIGHT FINDER AN/FPS-6. — Dunlap and Associates, Inc., Stamford, Conn. (Contract AF 30(602)-215, Task Order .04); issued by Rome Air Development Center, Human Factors Office, Griffiss Air Force Base, N. Y. [Report no. RADC TN-54-80], Oct. 1953. 3+24 p. AD 31 811 UNCLASSIFIED

The design of the AN/FPS-6 height finder is considered to contain several excellent examples of the application of human-engineering principles. The following characteristics of the RHI assembly are considered noteworthy: illumination of labels and scales, terminology of labels, shapes of knobs, direction of knob movement with relation to display,

range of variation of controls, location of switches with respect to the knobs, location of scales in relation to the display, height of writing surface, and control of illumination. Also considered noteworthy are the direction of movement of controls with relation to the display and control of illumination in the Plan Position Indicator (PPI) overlay; the time-sharing master control; and the remote height display. Discussions are included for the effect of work periods on operator fatigue and alertness, clearing the counter and dial at the PPI position, offcentering the PPI scope, independent measurements of altitude, and fine adjustments of the antenna. (AD abstract)

1248

Coakley, J. D., and J. T. Fucigna 1953a

A HUMAN ENGINEERING REVIEW OF THE CONTROL TOWER CONSOLE AN/FRC-19. — Dunlap and Associates, Inc., Stamford, Conn. (Contract AF 30(602)-215, Task Order .04); issued by Rome Air Development Center. Human Factors Office, Griffiss Air Force Base, N. Y. [Report no. RADC T. N. 54-167], Dec. 1953. 1+18 p.
AD 36 919 UNCLASSIFIED

A description and evaluation of the AN/FRC-19 control tower console is given, and recommendations are made for the location of the altimeter, the relocation of the direction-finding equipment and transmitter panel, the transmission of weather information, illumination, and the storage of miscellaneous items. Detailed recommendations and the functions of personnel who utilize this console are contained in appendices. (AD abstract)

1249

Cochran, L. B. 1953

STUDIES ON THE EASE WITH WHICH PILOTS CAN GRASP AND PULL THE EJECTION SEAT FACE CURTAIN HANDLES. — Jour. Aviation Med., 24 (1): 23-28. 1953
DLC (TL555.A1A4, v. 24)

Thirty naval fighter pilots, of various anthropometrical measurements, were tested on the Pensacola Human Centrifuge in their ability to actuate the Martin-Baker type ejection seat mechanism. For these tests the subjects, protected by antiblackout suits, were subjected to levels of positive radial acceleration about 2.0 g above their relaxed blackout-tolerance level. The results suggest that, unless extremely fatigued, most suit-protected pilots should be able to perform the arm movements necessary to actuate the Martin-Baker type ejection seat at 2.0 g above their control blackout level if the g were a constant one. There were no means available by which their ability could be tested under conditions of fluctuating g levels. A marked degree of success would appear to depend on the pilot's pre-knowledge of the effects of such forces on him and his plane, and proper instruction as to procedure and techniques employed which facilitate his ability to actuate the ejection seat under high accelerative forces. This portion of success could be made available through lecture training and centrifuge indoctrination. (Author's summary and conclusion)

1250

Cocquyt, P. 1953

SENSORY ILLUSIONS. — Shell Aviation News, no. 178: 19-24. April 1953.
DLC (TL501.S55)

Several phenomena are described caused by sensory and/or optical illusions which may be related to flight accidents. At constant speed and gravity, the most dangerous illusions are those disenabling the pilot to determine the position of the aircraft with relation to any of the three axes of freedom (pitch, yaw, and roll). When visibility is poor over an area without landmarks, or when flying at night or over level surfaces of water or deserts, the pilot has few points of reference by which to orient himself correctly. The combined effect of gravity and acceleration can deprive the pilot of any exact knowledge in space and may lead him to make errors of 180° on either the yaw, the rolling or the pitching axes. In blind flying, cenesthetic sensations usually allow consciousness of position with respect to the ground; however, visual stimuli usually establish the true position of the pilot. If insufficient evidence is gained from visual stimuli an error may occur. Apparently, incorrect estimations of relative heights based on illusions are the cause of most commercial aviation accidents. Investigations of various accidents indicate that illusions relating to horizontal distances are not as hazardous to pilots. Apparently, most accidents caused by optical illusions may be avoided by greater reliance on the use of instruments.

1251

Cocquyt, P. P. 1953

ACCIDENTS! ARE ILLUSIONS A CAUSE? — Aviation Age, 19 (1): 34-39. 1953.
DLC (TL501.A8187, v. 19)

The determination of the relative position of an aircraft by its pilot with relation to the horizon is a more difficult feat than the determination of direction. It is also very difficult to judge height where there is no landmark to use as a reference; thus, many planes have been flown into a calm sea because the pilots could not correctly judge the distance to the surface. The cause of most commercial accidents is an incorrect estimation of altitude due to illusions with regard to the horizon. The estimation of horizontal distance is also subject to errors caused by optical illusions. The hazards of these optical illusions may be eliminated by instructing pilots to use their instruments for the verification of all optical sensations while piloting their craft.

1252

Cole, B. T., K. E. Penrod, and F. G. Hall. 1953

THE HEMOTOCRIT AND HEMOGLOBIN RESPONSE OF BLOOD DONORS. — Jour. Aviation

Med., 24 (3): 227-229. 1953.
DLC (TL555.A1A4, v. 24)

Hematocrit and hemoglobin studies have been carried out for twenty-eight days post-hemorrhage on eleven men who made Red Cross blood donations. The average fall in hematocrit in this group was 11.7% and the average hemoglobin fall was 13%. The time at which the minimum values occurred varied among subjects, but was predominantly between the second and sixth day. Multiple studies were made on three subjects, one of whom gave three donations without complete recovery between. In each case the minimum recovery period for both hematocrit and hemoglobin appeared between the second and third week after bleeding. From the standpoint of effect of blood donations on hypoxia tolerance, it is concluded that change in hemoglobin by a given subject is usually less than the variation among subjects, such that as a group no impairment would be detectable. (Authors' summary)

1253

Comfort, E., 1953
and K. W. Gillespie
RESPIRATORY RESPONSE TO OXYGEN BREATHING WITH A FULL-HEAD OXYGEN MASK. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-130, April 1953. vii+12 p. (RDO no. 696-61). AD 23 892
UNCLASSIFIED

An investigation was conducted to determine the extent to which dead space affects use and operation of full-head oxygen masks, which as adjuncts to altitude suits are of increasing importance to the United States Air Force. In order for equipment of this type to be acceptable to individual flyers, pulmonary ventilation must be maintained within relatively normal limits. Results of this investigation indicate that the volume available in the K-1 full-head oxygen mask bladder permits excessive rebreathing of expired carbon dioxide during normal breathing at ambient pressure. In order for this type of oxygen mask to be physiologically and subjectively acceptable, volume fluctuations of the bladder during the breathing cycle must be limited by breathing at a minimum positive pressure of 3-4 inches H_2O. (Authors' summary)

1254

Comstock, C. C., 1952a
and F. W. Oberst
CHRONIC INHALATION TOXICITY OF HYDRAZINE VAPORS TO DOGS AND RATS. — Federation Proceedings, 11(1[I]): 333. 1952.
DLC (QH301.F37, v. 11)

The chronic inhalation toxicity of hydrazine vapors (concentration, 6 mg./m.^{3}) was determined on 2 dogs and 20 rats. One dog and 10 rats served as controls and were kept under the same conditions as the experimental animals. Exposures were made 6 hours each day, 5 days/week, for 31 weeks. The control dog lost 16% of his original body weight and the experimental dog 29%. There were periods of loss of appetite alternating with periods of normal food consumption throughout the experiment. Beginning with the 11th week, the loss of appetite was accompanied by muscle tremors, weakness, and vomiting. These signs became more severe with each period of loss of appetite. During the course of the experiment, blood counts and blood chemistry were normal except for an increased stab count and a mild hypoglycemia toward the end of the experiment. The rats continued to gain weight throughout the experiment at the same rate as the controls. Beginning with the 23d week the rats became lethargic. Two died during the 28th week. Autopsies of the dogs and rats showed that tissue alterations were confined chiefly to the lungs. The rats exhibited an interstitial pneumonitis with a few localized areas of alveolar emphysema. The dogs' lungs had alternating patchy areas of emphysema and atelectasis which were sufficiently large to be visible grossly. The musculature of the bronchioles was found to be undergoing hypertrophy. (From the authors' abstract)

1255

Conklin, J. E., 1953
A. Baldwin, and Robert H. Brown
APPARATUS FOR MEASURING THE THRESHOLD FOR VISUAL DISCRIMINATION OF DIRECTION OF MOVEMENT. — Amer. Jour. Psychol., 66 (2): 289-294. 1953.
DLC (BF1.A5, v. 66)

An apparatus was designed to measure the thresholds for visual discrimination of the direction of movement as a function of exposure-time. Although the apparatus was specifically constructed for the movement of a spotlight in complete darkness, it can be readily adapted to faint illumination if required. The equipment incorporates four desirable features: (1) the presentation is noiseless; (2) the movement within a given trial is made at a constant rate; (3) the rate of movement may be accurately varied; and (4) it has an automatic timing device for controlling exposure. In an illustrative experiment six dark-adapted subjects had to regard a fixation point on the screen. After 6 seconds of fixation, the screenlight went out and a green spot of light appeared, moving either to the right or to the left, and then disappeared leaving the subject in total darkness. The direction of the light spot had to be reported after it had disappeared; the procedure was repeated when the screen light was turned on again. The rate of thresholds in degrees of visual angle per second as a function of exposure time is graphically illustrated. The analysis of variance indicates that the only significant variables are individual differences among the subjects and exposure times.

1256

Conrad, R. 1953
MISSED SIGNALS IN A SENSORI-MOTOR SKILL. — Medical Research Council (Gt. Brit.). Applied

Psychology Research Unit, Cambridge. Report no. A.P.U. 187/53, Feb. 1953. 16 p. AD 22 139 UNCLASSIFIED

To explain why speed increases in the demanded rate of work in a sensori-motor skill led to a disproportionate deterioration in performance, specific association was sought between signals omitted and definable temporal relationships occuring as a result of continuous display changes. The distribution of the time intervals between the signals presented was such that some relationships occurred many times more often than others, the frequency being determined by the mean signal speed. A detailed examination of performance in these terms revealed that omissions occurred close to the nearest response more often than would be expected by chance, and they were as likely to occur just before the response as just after. Furthermore, the probability that a signal would be omitted when it occurred a constant time interval from a response, increased linearly with mean speed. The effect of increasing the signal speed was twofold. Firstly, it increased the chances that a signal would occur close to a response, thus subjecting it to a hazardous temporal situation. Secondly, if a signal did occur close to a response it increased the chances that it would be omitted. This latter effect was not due to the crowding in of other specific events as the speed increased, but to the general effect of a shortage of time in the situation as a whole. (Author's summary)

1257

Conrad, R. 1953a
TIMING. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 188/53, Feb. 1953. 12 p. AD 22 138 UNCLASSIFIED

Reaction time theory has limited value for an understanding of skilled performance because it is largely based on the assumptions that signals will occur suddenly and will require immediate response. Generally, however, signals can be detected in advance; frequently the problem will be not the hastening of response, but the delaying of it until the best moment. Timing permits the skilled operator to manipulate the time within the inherent limits. Good timing in fact provides the optimum temporal conditions for response. (Author's summary)

1258

Conrad, R. 1953b
THE TEMPORAL ACCURACY OF RESPONSE IN A SENSORI-MOTOR SKILL. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 186/53, May 1953. 14 p. AD 22 137 UNCLASSIFIED

An attempt was made to explain the accuracy with which a series of responses could be matched to a series of signals by reference to the continuously changing temporal relationships between these events. Although approximately half of the responses were made too soon and half too late, this distribution was not fortuitous. The temporal position of a response in relation to the signal which started it was influenced both by the position of the previous response, and by the position of the signal for the next response. Not only did these events determine whether a response would be made early or late, but to a large extent they influenced the size of this error. Thus, whilst the character of the temporal structure of events around a signal determined the relative accuracy of the response, the mean signal speed in relation to the mean response rate, determined the frequency with which particular temporal structures occurred. The underlying factors that actually determined the character of the response were shown to be masked when the effects of certain experimental variables on response were presented as mean accuracy values. (Author's summary)

1259

Cooper, D. Y., 1953
G. L. Emmel, R. H. Kough, and C. J. Lambertsen
EFFECTS OF CO_2 INDUCED HYPERVENTILATION UPON THE ALVEOLAR-ARTERIAL pO_2 DIFFERENCE AND THE FUNCTIONAL RESPIRATORY DEAD SPACE IN NORMAL MEN. — Federation Proceedings, 12 (1^{I}): 28. 1953. DLC (QH301.F37, v. 12)

Measurements were made of arterial blood pCO_2 and pO_2 by the microtonometric method, respiratory minute volume by Tissot spirometry, and the per cent composition of expired air by analysis with the Scholander 0.5-cc. gas analyzer during the inhalation of air, 4.31% CO_2 in 21.13% O_2, and 5.48% CO_2 in 21.57% O_2. Respiratory rate was counted. The values obtained were used to calculate the effective alveolar pO_2, the alveolar-arterial pO_2 difference and the functional respiratory dead space. With inhalation of 0.04, 4.31, and 5.48% CO_2, average dead space values were 142, 216, and 385 ml., while the alveolar-arterial differences were 10.7, 23.7, and 27.6 mm. Hg, respectively. (From the authors' abstract)

1260

Coplans, R. M. 1953
NAVAL AVIATION MEDICINE. — Med. Jour. Australia (Sydney), 2 (5): 161-164. 1953. DNLM

The progress of naval aviation medicine in Great Britain and Australia was reviewed at a special group meeting on aviation medicine, held in 1952 at Melbourne, Australia, by the British Medical Association. It was pointed out that the role of the British Navy has been greatly enhanced by naval aviation research. Both British and Australian aeromedical units have directed their efforts to the development of equipment to be used by pilots under conditions of extreme cold. Work has also been done on the perfection of solar stills for the purification of water. The importance of selecting navy flying personnel capable of withstanding the added stresses imposed by duty aboard carriers is mentioned.

1261

Cordier, D., and G. Dessaux 1952a

[FLUCTUATIONS IN THE PERCENTAGE OF VARIOUS FORMS OF HEART GLYCOGEN UNDER THE INFLUENCE OF PROLONGED ANOXIA] Variations du taux des diverses formes du glycogène cardiaque sous l'influence d'une anoxie de longue durée. — Journal de physiologie (Paris), 44 (4): 703-707. 1952. In French.
DLC (QP1.J75, v. 44)

The lyo-glycogen and desmo-glycogen contents (i.e., the free and the compound forms) in the myocardium and the variations in these contents under prolonged anoxia were studied in white female rats, starved for 24 hours. Tests in 17 normal rats showed that the total glycogen content (536 mg./10(gm. of tissue) consisted of 55% of lyo-glycogen and 45% of desmo-glycogen. This distribution of the free and the compound form is remarkably constant in the myocardium of the normal rat. When 16 rats were exposed to severe and prolongec anoxia (5% of O_2 and 95% of N_2, for 3.5 hours), the average lyo-glycogen content found was 63 mg./100 gm., the average desmo-glycogen content, 154 mg./100 gm., amounting to a total of 217 mg. of glycogen. A previous study by the authors (Journal de Physiologie, 43 (4): 701-703, 1951) had shown that, under similar anoxic conditions, the myocardial glycogen of the rat decreased at the rate of 100 mg./100 gm. tissue per hour; after 150 minutes it was down to approximately 200 mg. and stabilized at this level for the rest of exposure to anoxia; this level appears therefore to be the limit of glycogen compatible with survival. At this point the glycogenic reserve has dropped to 40% of its initial value (the lyo-glycogen has decreased by 79%, and the desmo-glycogen by 37%).

1262

Cordier, D., and G. Dessaux 1953

[ACTION OF PERCORTEN ON THE CARDIAL GLYCOGEN CONTENT IN HISTAMINE-INTOXICATED OR BURNED RATS SUBJECTED TO SEVERE ANOXIA] Action du percortene sur le taux du glycogène cardiaque chez les rats intoxiqués par l'histamine ou choqués par brûlure et soumis à une anoxie aiguë. — Comptes rendus de la Societe de biologie (Paris), 147 (15-18): 1372-1375. 1953. In French. DLC (QP1.S7, v. 147)

After an earlier study has shown that the myocardium of burned or histamine-intoxicated rats largely loses its power to utilize its glycogene reserve under anoxia, a study has now been undertaken to demonstrate the ability of percorten (= -D-desoxycorticosterone glucoside) to counteract this deficiency. Skin-burns were inflicted which normally would induce death after 13-15 hours. In another group of animals histaminic intoxication was produced, which would normally be followed by 3 days of survival. Percorten (2.5 mg.) was then injected subcutaneously, either 5 minutes after the injury, followed 7 hours later by inhalation of pure nitrogen, or 15 minutes before the nitrogen inhalation. Results show that in histamine-intoxicated rats the percorten injection (at either time) induces a slightly greater release of glycogene (lyo-glycogene only) than in the non-treated animals. In burned animals, the late percorten injection remains without effect, the early injection slightly favors glycogene release (lyo-glycogene). Thus, the myocardium of burned or histamine-intoxicated rats looses an important part of its power to utilize its glycogenic reserve, if the animals are submitted to anoxia.

1263

Cordier, D., and G. Pérès 1953a

[THE EFFECT OF MOUNTAIN CLIMATE ON GLYCEMIA IN RATS] Influence du climat de montagne sur la glycémie du rat. — Comptes rendus de la Société de biologie (Paris), 147 (15-18): 1377-1379. 1953. In French.
DLC (QP1.S7, v. 147)

Variations in glycemia were studied in rats during acclimatization to mountain climates at 1800 m. (18-22°C) and 3450 m. (12-15°C) above sea-level. At 1800 m. a slight increase in blood sugar was observed during the first 3 hours (short sympatheticotonic phase), followed by slight hypoglycemia (vagotonic phase) during the subsequent 10 days of observation. Elevation to 3450 m. induced another sympatheticotonic phase characterized by greater and longer lasting hyperglycemia (observed for 24 hours), which confirms E. Grandjean's (Journal de Physiologie, Rapports, 40 (1): 51A-96A, 1948) and A. Fleisch and E. Grandjean's findings (Helvetica Physiologica Acta, suppl. III: 35-45, 1944) to the effect that: "the higher one rises above sea-level, the longer the time of adaptation and the sympatheticotonic phase." The difference in temperature may also have contributed to glycemia changes.

1264

Cordier, D., and G. Dessaux 1953b

[DEVELOPMENT OF PNEUMONOSES IN RATS SUBMITTED TO PROLONGED ANOXIA OR ASPHYXIA] Dévelopment de pneumonoses chez les rats soumis à des anoxies ou à des asphyxies de longue durée. — Comptes rendus de la Societe de biologie (Paris), 147 (15-18): 1407-1410. 1953. In French. DLC (QP1.S7, v. 147)

Seven rats, having breathed 5% oxygen and 95% nitrogen for 3 hours showed a pulmonary weight of 7.07 gm./kg. body weight, as compared to 6.53 gm./kg. body weight in 23 controls. In 7 rats breathing a gaseous mixture containing 5% O_2 and 16% CO_2 for the same length of time, the pulmonary weight was 8.01 gm./kg. body weight; in 9 animals having inhaled 5% O_2 and 20% CO_2 during 2 hours it equalled 8.11 gm./kg. body weight. These results (as those of earlier studies) indicate that inhalation of a mixture containing 5% O_2 and 12-20% CO_2 induces in a few hours a pre-edematic state in the lungs (pneumonosis) which is reflected in a 25% increase of pulmonary weight. A 25%

concentration of CO_2 rapidly produces a characteristic pulmonary edema. Inhalation of 5% O_2 without CO_2 causes an increase in pulmonary weight of less than 10%.

1265

Cordier, D., and G. Pérès 1953c

[COMPARED ACTIONS OF CORTISONE AND β-D-DESOXYCORTICOSTERONE GLYCOSIDE ON INTESTINAL ABSORPTION DISTURBANCES OF GLUCOSE INDUCED BY SOLAR SHOCK AT SOME ALTITUDE] Action comparée de la cortisone et du β-D-glucoside de desoxycorticosterone sur les troubles de l'absorption intestinale du glucose provoqués par le choc solaire en altitude. — Comptes rendus de la Societé de biologie (Paris), 147 (15-18): 1410-1412. 1953. In French. DLC (QP1.S7, v. 147)

Intestinal absorption was studied in 7 rats kept at a water diet for 48 hours, at 1800 m. altitude, and exposed to the sun (28-31°C.) for 50 minutes in a dorsolumbar position. A 20% glucose solution (3 cc.) was introduced into the small intestine, ligated at both ends, under short ether anesthesia. Controls were kept in the shade (at 20° C.), Cortisone or percorten (β-D-desoxycorticosterone glucoside) was injected (2.5 mg.), 2 hours before the start of intestinal absorption. Results showed a 37% glucose absorption in the animals exposed to the sun against 47% in the controls. In the 5 percorten-treated animals the absorption rose to 46%; in 8 cortisone-treated rats it was 50%. Thus, the delaying effect of sun exposure on intestinal glucose absorption is neutralized by cortisone or percorten alike. The general condition was far better in the treated than in the non-treated animals. The latter were in a coma after 50 minutes of exposure.

1266

Cordier, D., and J. Piéry 1953d

[RELATIONSHIP BETWEEN THE CHANGES IN POTASSIUM CONTENT OF THE HEART AND THE METABOLIC DISTURBANCES OF MYOCARDIAL GLYCOGEN INDUCED BY ANOXIA OR CARBON DIOXIDE INTOXICATION] Relations entre les modifications du taux du potassium cardiaque et les troubles du métabolisme du glycogène myocardique provoqués par l'anoxie ou l'intoxication carbonique. — Comptes rendus de la Société de biologie (Paris), 147 (15-18): 1412-1414. 1953. In French. DLC (QP1.S7, v. 147)

The relationship between potassium metabolism and glucide metabolism is well known. Two previous studies (D. Cordier and G. Dessaux, Comptes rendus de la Société de biologie, 145 (9-10): 727-729; (19-20): 1542-1546, 1951) have shown that severe anoxia (inhalation of nitrogen) induces almost complete disposal of cardiac glycogen in the rat, while inhalation of pure CO_2 induces a relatively slight decrease in glycogen. A study is now presented of the changes in myocardial potassium content in 47 rats under the above-mentioned conditions. The results show that during severe anoxia (inhalation of pure N_2) a considerable decrease in the myocardial glycogen reserve is accompanied by a decrease in myocardial potassium (from 332 mg. to 294 mg. per 100 gm. of fresh tissue). During inhalation of pure CO_2, the decrease in the cardiac glycogen reserve is unsubstantial, and the potassium decrease less pronounced than in true anoxia (323 mg./100 gm.).

1267

Cordier, D., and G. Dessaux 1953e

[FLUCTUATIONS IN THE GLYCOGEN RESERVE OF THE HEART DURING PROLONGED ASPHYXIA. THE EFFECT OF CARBON DIOXIDE TENSION IN THE GASEOUS MIXTURE] Variations de la réserve glycogéniques cardiaque durant une asphyxie de longue duree. Influence de la tension de l'anhydride carbonique dans le mélange gazeux. — Journal de physiologie (Paris), 45 (1): 96-99. 1953. In French. DLC (QP1.J75, v. 45)

Mixtures containing 5% oxygen and increasing amounts of CO_2 were breathed by 106 rats, kept at 20° C. In 23 rats the effects of anoxia were compared to those of asphyxia. Results showed that sudden severe anoxia diminishes the glycogenic reserve of the myocardium from the normal 500 mg./100 gm. of fresh tissue to 401 mg. after one hour, to 213 mg. after 3 hours. Carbon dioxide, even at low concentrations, exerts a delaying action on cardial glycogen consumption. However, as the CO_2 percentage approaches 20% (incompatible with prolonged survival), the glycogenic reserve diminishes progressively from 364 mg./100 gm. after one hour to 131 mg. after 3 hours. It is believed that the lesser oxygen content in hemoglobin when breathing 20% of CO_2 and 5% O_2 results in pulmonary damage (pneumonosis). The added anoxic factors bring the effect of 20% CO_2 + 5% O_2 inhalation close to that of N_2 + 20% CO_2 inhalation, since a very low O_2 tension cannot counterbalance a CO_2 tension of 20%. - Cardial glycogen exists in form of a free (lyo-glycogen) and a combined (desmo-glycogen) substance. After 150 minutes of 5% O_2 inhalation (200 mg. of glycogen/100 gm.), the lyo-glycogen amounts to 50 mg./100 gm., the desmo-glycogen content to 150 mg. Low CO_2 concentrations (1-2%) "protect" desmo-glycogen more than lyo-glycogen against anoxic wasting; higher concentration (4-8%) exert complete protection.

1268

Corso, J. F. 1953

THE EFFECTS OF NOISE ON HUMAN BEHAVIOR. — Dec. 1952 [issued 1953]. 65 p. Pennsylvania State Coll., State College (Contract AF 33(038)-786); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-81. (RDO no. 695-63). AD 18 259 UNCLASSIFIED

Six studies were conducted on the effects of

high-intensity noise (100 to 116 db) on human behavior. The pulse rate and pulse pressure were fairly accurate measures for differentiating between noise-susceptible and non-noise-susceptible individuals. No marked effect was noted on mental performance as measured by intelligence tests or on the retention of nonsense syllables and meaningful verbal material. No personality characteristics were isolated to serve as predictors of human performance under noise stress. (AD abstract)

1269

Cotes, J. E. 1953
DECOMPRESSION SICKNESS WITH POST-DECOMPRESSION COLLAPSE. — Flying Personnel Research Committee (Gt. Brit.). Report no. 825, April 1953. 10 p. AD 41 107 UNCLASSIFIED

Three cases are described of post-decompression shock in subjects undergoing decompression trials at the RAF Institute of Aviation Medicine. In the first two cases the most marked symptoms were haemoconcentration, pulmonary edema, nystagmus, and absent tendon reflexes; loss of consciousness occurred 1 minute and 33 minutes respectively after reaching an altitude of 37,000 feet; following descent, recovery was uneventful. In case 3, circulatory collapse terminated fatally 5 hours after the initial decompression to 40,000 feet. The subject developed a cough, pain in the chest, and collapse about 1 minute after a rapid ascent, but was symptom-free on reaching ground level. Half an hour after the initial symptoms, he complained of mild headache; blood pressure was normal but gross haemoconcentration (65%) was evident. Oxygen was administered, but full intravenous therapy was only begun 3 hours after the initial symptoms. At post mortem there were pleural, pericardial, and peritoneal effusions. The cerebrospinal fluid was blood-stained. There was pulmonary edema, subendocardial haemorrhages, congestion of the brain and viscera. Chronic abscesses, compatible with infection by Brucella melitensis, were found in the left testicle, kidney, and spleen. Tissue-fluid studies showed that fluid lost from the blood by haemoconcentration did not accumulate in the brain or muscles and could not all be accounted for by serous cavity effusions and pulmonary edema fluid. (Author's summary, modified)

1270

Covas Coro, R. 1953
[AVIATION MEDICINE] Medicina aeronautica. Habana, Cuba: [No publisher], 1953. 237 p. In Spanish. DNLM (WD700. C873m, 1953)

This symposium, held in connection with a popular course in aviation medicine at the University of Habana, deals with the following subjects: history of aviation medicine; basic physical and physiological principles; physical examination of aviators; visual perception; depth perception; photometry; accommodation; color vision; examination of the eye fundus; oto-rino-laryngology; the cardiovascular system; personality disturbances; physiopathology of flight; and psychoanalytical test.

1271

Cox, J. A. 1952
VALIDITY OF AIRMAN CLASSIFICATION BATTERY VARIABLES FOR PHASE GRADES IN AIRFRAME REPAIRMAN TECHNICAL SCHOOL — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-29, July 1952. 12 p. (Project no. 503-001-0001). ATI 161 672 UNCLASSIFIED

This study was undertaken to gather information which would contribute to the understanding of the final school grades of the Airframe Repairman Technical School. It was based upon the hypothesis that, through better understanding of the relationships of the predicting variables and of the elements of the criterion, improved classification procedures might result. Course grades were used as separate criteria; the Airman Classification Battery AC-1B variables, plus age and years of education were used as predictors. Correlations were computed for each variable with each criterion. Considerable differences were found in the multiple correlations involving the separate criteria. "Biographical Inventory" keys contribute little to the prediction, while age and education, as variables, are making a greater contribution to prediction. It is believed that some psychomotor tests might well prove valuable predictors, the same as attitude surveys.

1272

Crampton, G. H., 1953
and F. A. Young
THE DIFFERENTIAL EFFECT OF A ROTARY VISUAL FIELD ON SUSCEPTIBLES AND NONSUSCEPTIBLES TO MOTION SICKNESS. — Jour. Compar. and Physiol. Psychol., 46 (6): 451-453. 1953. DNLM

Two groups of subjects, some susceptible, the others not susceptible to motion sickness, were placed into a rotating room, in which they remained stationary. The subjects were instructed to watch the floor, walls or ceiling, and were given the impression that the chair was to be rotated during the test. Nausea, light nausea, dizziness or no symptoms at all were observed among the subjects. Individuals susceptible to motion sickness were also susceptible to nausea, and, conversely, non-susceptibles were resistant to nausea. It is concluded that some individual differences (with regard to nausea) in response to rotary visual fields may be directly related to motion sickness.

1273

Crawford, F. R., 1953
and F. H. Esch
SITUATIONAL FACTORS AND ATTITUDES EXPRESSED TOWARD DUTY WITH ARDC. — Human Resources Research Inst., Maxwell Air Force Base, Ala. Technical Research Report no. 19, Sept. 1953. vii+27 p. (Project no. AF 505-036-0011). AD 19 887 PB 117994

Questionnaire responses concerning duty with the Air Research and Development Command (ARDC) were obtained from 280 officers at 3 non-isolated centers (NIC's) and 81 officers at 4 isolated special-mission centers (IC's). Differences in attutide were related to the degree of isolation and the mission of the center. The officers at NIC's performing multiple-phase diversified research and development work gave more favorable responses than IC officers on the following subjects: the indoctrination course, Air Force and ARDC life, utilization of abilities and interests, assignment, supervisors, on duty relations with others, and contribution to national defense. (AD abstract)

1274

Crook, D. J., 1953
J. A. Hanson, P. I. McBride, and J. W. Wulfeck
A BIBLIOGRAPHY ON DARK ADAPTATION. — July 1953. ii+27 p. Tufts Coll., Medford, Mass. (Contract AF 30(602)-199); issued by Armed Forces-National Research Council Vision Committee, Ann Arbor, Mich. AD 19 588 UNCLASSIFIED

The bibliography includes (1) material on the effects of intensity, duration, and wave length of preceding light on dark adaptation; (2) theoretical material on the course of dark adaptation, providing it is based on specific experimental evidence; (3) characteristics of the subject that are significant in adaptation—the effects of age, drugs, fatigue, muscular activity, intersensory stimulation, etc.; and (4) methodological studies such as comparison of various measures of sensitivity, effects of various psychophysical procedures, effect of retinal area, and effect of size and brightness of test patch surround. 417 references. (AD abstract)

1275

Cuénot, A., 1953
and H. Laborit
[PHYSIO-BIOLOGICAL STUDY OF THE ACCLIMATIZATION SYNDROME] Etude physio-biologique du syndrome d'acclimatement. — Presse médicale (Paris), 61 (38): 796-799. 1953. In French. DNLM

A study was made of physiological changes during and after altitude acclimatization. Six subjects were taken from Arcachon, France (sea level), to Castillon in the Pyrenees (no altitude given) and returned to Arcachon after 15 days. Results, after arrival at Castillon, were as follows: From the first hour, pronounced eosinophilia was observed, followed by a sharp drop, and (on the 8th day) a sudden increase in eosinophils, which persisted until the return. The basal metabolism increased progressively and continued even after the return to the plain. Arterial pressure showed a slight general decrease, which became more pronounced after the return to sea level. The sedimentation rate decreased progressively. Leucopenia started immediately and persisted during the whole sojourn, varying in inverse proportion to eosinophilia. The body weight decreased during the first week but increased during the second week. It is deduced from these findings that the change in altitude provokes an intense histaminocholinergic reaction during the first hours, followed, from the second day on, by an adrenoglycocorticoid reaction and, on the 8th day, by a sharp but fluctuating vagotonic anabolic reaction, which persists until the return to the plain. The 8th day indicated beginning immunity against the allergens of the surrounding aerosol. The observed eosinophilia resembled that of convalescence. It is concluded that the acclimatization syndrome should be considered a phenomenon of neuro-endocrine stimulation rather than irritation.

1276

Culver, G. A., 1952
and H. Rahn
REFLEX RESPIRATORY STIMULATION BY CHEST COMPRESSION IN THE DOG. — Amer. Jour. Physiol., 168 (3): 686-693. 1952. DLC (QP1.A5, v. 168)

Chest compression, by means of pressure cuffs or by inducing negative pulmonary pressure in a Drinker respirator, was applied to dogs whose pulmonary ventilation had been curtailed by injection of pentobarbital. An increase of respiratory response (minute volume) was observed. This reflex action was abolished by bilateral and frequently by right vagus block. The correlation of pressure applied, degree of anesthesia, and respiratory response was recorded and expressed graphically.

1277

Dailey, J. T., 1953
and R. J. Mays
USE OF SPELLING AND HANDWRITING MEASURES AS A CHECK ON THE TECHNICIAN SPECIALTY APTITUDE INDEX. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin 53-4, March 1953. v+9 p. (Project no. 503-001-0007). AD 14 724 PB 110717

The relationship of spelling and handwriting performance to intelligence levels was determined in a study into the influence of malingering (the deliberate faking of low scores) on selection and classification tests. A dictation test regarding the adequacy of indoctrination was scored for phonetic and nonphonetic misspelling, omissions, use of lower-case letters contrary to instruction, use of slanted lines, and use of script, reversed and oversized letters. The measures were correlated with scores on the Technician Specialty Aptitude Index, and certain relationships were indicated. Intelligent individuals were found to misspell phonetically, but the less intelligent individuals usually misspelled both phonetically and nonphonetically. The test was difficult to administer and score, and it was time-consuming. Concealment of purpose and scoring from the subject was considered unlikely. (AD abstract)

1278

Daniels, G. S. 1953
THE "AVERAGE MAN"? — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note no. WCRD 53-7, Dec. 1952 [issued 1953]. 7 p. (RDO no. 695-71). AD 10203 UNCLASSIFIED

This report was prepared from statistics compiled by Antioch College, Yellow Springs, Ohio, under AF contract 18(600)-30 (RDO no. 695-71, "USAF Personnel Body Anthropometry" project). The fallacy of the "average man" concept is illustrated by the results of body measurements made of 4,063 Air Force flying personnel. After establishing the average measurements of various criteria, such as chest circumference, sleeve length, etc., it was found that none of the subjects matched ten such criteria. A "method of deriving approximate average" is outlined in the appendix.

1279

Daniels, G. S., 1953a
H. C. Meyers, and S. H. Worrall
ANTHROPOMETRY OF WAF BASIC TRAINEES. — July 1953. iv+103 p. Antioch Coll., Yellow Springs, Ohio (Contract AF 18(600)30); and Wright Air Development Center. Aeromedical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-12 (RDO no. 695-71). AD 20 542 PB 111326

Body size data for 63 measurements of 852 Women's Air Force basic trainees are presented for use by the designers of Air Force equipment. The statistics reported for each measurement include the mean, standard deviation, coefficient of variation, standard errors of these measurements. range, and selected percentiles from the first to the ninety-ninth. In general, these statistics are reported in both the metric and English values. A complete description of the anthropometric techniques used is presented. (Authors' abstract)

1280

Daniels, G. S., 1953b
H. C. Meyers, and E. Churchill
ANTHROPOMETRY OF MALE BASIC TRAINEES. — July 1953. iv+99 p. Antioch Coll., Yellow Springs, Ohio. (Contract AF 18(600)-30); and Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-49 (RDO no. 695-71). AD 20 717 PB 111325

Body size data for 60 measurements of over 3,000 Air Force male basic trainees are presented for use by aircraft and equipment designers. The statistics reported for each measurement are: the mean, standard deviation, coefficient of variation, standard errors of these statistics, range, and selected percentiles from the first to the ninety-ninth. In general, the statistics are reported in both the metric and English values. A complete description of the anthropometric techniques used is presented. (Authors' abstract).

1281

D'Arcangelo, P., 1953
and A. Scano
(EFFECTS OF SODIUM SUCCINATE UPON THE RESPIRATION OF MAN) Effetti del succinato di sodio sulla respirazione nell'uomo. — Rivista di medicina aeronautica (Roma), 16 (2): 182-191. 1953. In Italian, with English, French, Spanish, and German summaries (p. 190-191).
DLC (TL555.A1R5, v. 16)

Administration of sodium succinate to breathing tissues in vitro causes an increase in their O_2 consumption. However, use of succinic acid as a stimulant of respiratory function in man has so far not produced convincing results. In an attempt to explore the physiological mechanism underlying the effects of succinic acid, the authors have carried out a series of experiments with a particular view toward application of findings in the prevention and treatment of anoxia. Succinic acid was administered intravenously to 9 subjects. The results were as follows: (1) no remarkable change in respiratory rate; (2) hardly any change in respiratory volume; (3) little change in alveolar partial pressure of oxygen and carbon dioxide; (4) only a small increase in the oxygen consumption rate; and (5) no considerable alterations in respiratory quotient, duration of apnea, arterial oxygen tension, or pulse rate.

1282

Darcus, H. D. 1952
ANATOMY AND FATIGUE. — In: Ross, S., Report on 'Symposium of Fatigue"..., p. 5. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309
UNCLASSIFIED

The interest is stressed of the functional anatomist in fatigue problems, particularly in such problems as the effects of maintained or repeated muscular activity under conditions of maintenance of given levels of performance. There are known effects of repeated exertion: (1) same or lesser output with greater activity may result; (2) after given amounts of work, rest takes longer; (3) after continuous work, other muscles not directly used on the task might become involved; (4) continued exertion might lead to changes in the pattern of activity; (5) newly acquired habits may be affected more than older habits (ball grip—cylinder grip); (6) unusual movements cannot be maintained as well as more regular movements. Even after activity has ended, there may be effects, such as tremor, hypersensitivity of muscle, and edema producing "soreness". "Cramps" may occur when static movements are required for delicate movements; e.g., "scrivener's palsy" or "telegrapher's cramps." (S. Ross's summary, modified)

1283

Davidson, A. L., 1953
D. B. Devoe, S. D. S. Spragg, and R. F. Green

ACCURACY OF KNOB SETTINGS AS A FUNCTION OF: I. THE PLANE IN WHICH THE KNOB TURNS; AND II. THE DIAMETER OF THE KNOB. — Univ. of Rochester. Dept. of Psychology, N. Y. (Contract N6onr-241, Task Order 6); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Report no. SDC 241-6-8, Jan. 1953. 10 p. AD 119 858 UNCLASSIFIED

The knob apparatus used permitted to vary the plane of rotation, knob size, and size of angle. The limits of each angle were indicated by a pair of mechanical stops. The subject sampled the angle by turning first one way, next the other, and then made his final setting. In Experiment I tests were made with the knob rotating in three different planes — front, side, and top. In Experiment II eight knob diameters, ranging from 0.5 to 5.0 inches, were used. In both experiments the angular extents tested were 20, 40, 80, and 160 degrees The following results were obtained: (1) The plane of knob rotation made very little difference in the accuracy of knob settings. (2) The knob size was found to be important in that accuracy of settings improved as knob size increased from 0.5 to 2.0 inches, but for further size increases, accuracy did not change significantly. (3) Accuracy of knob setting increased as the size of the angle increased. And (4) there is a marked tendency for knob settings to be overestimated, especially for the smaller angles. (Authors' summary, modified)

1284

Davis, H. 1953
ACOUSTIC TRAUMA IN THE GUINEA PIG. — Central Inst. for the Deaf, St. Louis, Mo. (Contract AF 18(600)-58); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-58, March 1953. vi+52 p. (RDO no. 695-63). AD 13 028 UNCLASSIFIED

The ears of anaesthetized guinea pigs were exposed to intense tones of 185, 545, 2000 or 8000 c.p.s. at the sound pressure (at the eardrum) from 138 to 148 db. re 0.0002 microbar. The electrical output was recorded by differential electrodes before, during and after the exposures. The injury caused by 8000 c.p.s. centers in the basal turn, by 2000 c.p.s. in the second turn, by 500 and 185 c.p.s. in the third and fourth turns of the cochlea. No single tone, at the intensities and durations employed, injured all of the cochlea. The "threshold" of the cochlear microphonic and also its maximum voltage are valid indices of the anatomical injury seen under the microscope if the proper test frequencies and positions of electrodes are used. Electrical assessment of injury will expedite future studies of acoustic trauma. The destructiveness of a tone does not depend on its frequency. Equally severe (probably permanent) injuries were produced by a one-minute exposure at all four frequencies tested when the intensity level was about 144 db. at the eardrum. (Author's abstract)

1285

Davis, H., 1953a
D. H. Eldredge, A. Glorig, and W. C. Halstead

BIO-ACOUSTIC STUDIES OF HIGH INTENSITY AIRCRAFT ENGINE NOISE AT THE NAVAL AIR TEST CENTER AND ABOARD USS CORAL SEA (CVA-43). — Univ. of Chicago, Ill. Report on Biological Effects of Noise, -Exploratory, Nov. 20, 1953. 31 p. (Contract N6ori-02044). AD 47 051 UNCLASSIFIED

Audiometric measurements were carried out on aviation personnel, following intermittent exposures (15-second bursts separated by 30- to 45-second intervals) to noise from jet engines with and without afterburners (126-150 decibels). The experiment conducted at the Naval Air Test Center, Patuxent River, was preceded by similar tests aboard the USS "Coral Sea". All subjects were fitted with various types of ear protectors. No temporary hearing loss exceeding 10 db. was observed, nor was there evidence of abnormal physiological, psychological, or emotional reactions. No subject complained of pain in his ears during or after the exposures, nor of tinnitus or other otological symptoms. It is concluded that with respect to the immediate effects on personnel properly equipped with ear protectors (such as the V51-R earplug, alone or combined with earmuffs) jet-engine noise does not constitute a hazard under ordinary operative conditions. However, there was evidence that previous exposure to high-level noises had a cumulative effect on hearing. Although none of the losses observed in this category was incapacitating, it is advised to separate personnel from intense noise surroundings before there is danger of the hearing injury becoming permanent.

1286

Davis, H. 1953b
SURVEY OF THE PROBLEM. --- In: Benox report: an exploratory study of the biological effects of noise, p. 12-20. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

The psychological, physiological, technical, and sociological implications of noise in aviation and industry are summarized. The following topics in their relation to noise are briefly outlined: fear reactions, interference with speech communication, avoidance reactions, fatigue (chronic and temporary), hearing loss (permanent and temporary), aural pain, dizziness and nausea, interference with touch and proprioception, the community noise problem, and engineering aspects.

1287

Davis, H. 1953c
ACOUSTIC TRAUMA IN THE GUINEA PIG. — Jour. Acoust. Soc. America, 25 (6): 1180-1189. 1953. DLC (QC221.A4, v. 25)

Essentially the same as the report, Davis, H., 1953.

1288

Day, R. H. 1953
EFFECT ON A DIFFICULT COORDINATION OF

THE FREQUENCY OF SIGNALS. --- Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 815, Jan. 1953. 5 p. AD 11 246 UNCLASSIFIED

A study was made on the effect of signal frequency on the control of a fugitive spot of light. Subjects moved the hand and foot controls of the SMA-3 apparatus to direct a fugitive spot into one of four positions in accordance with changes in the signals. Simultaneously, the subjects were required to extinguish two lights, each in a different direction with the left hand. A significant increase in error resulted by increasing the signal frequency from the four successively but irregularly functioning sources; no effect was noted on the left-hand task. The order of signal sequence did not affect the scores. (AD abstract)

1289

Day, R. H. 1953a

EFFECT ON SKILL RESPONSES OF VARIATIONS IN THE DISPLAY OF A COMPLEX SENSORIMOTOR TASK. --- Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 815 (a), Jan. 1953. 3 p. AD 11 247 UNCLASSIFIED

Performance skill on a sensorimotor task was measured with respect to the frequency of signal changes, the set of readiness to respond to signals, and the size of the display area. The measurements were made by means of an SMA-3 apparatus. Four lights above the cathode-ray-tube screen were used to signal the correct position for the placing of the fugitive spot; a secondary task consisted of extinguishing two lights below the bowl with the left hand. Increasing the frequency of the signaling increased the number of fugitive-spot errors, although no effect was noted on the secondary-task performance. Pretask information did not improve the fugitive-spot performance, although an improved response on the secondary task was noted. An increase in reaction time with pretask information was indicated in responding to the four stimuli. When the area of display (cathode-ray-tube screen) was increased to 25 sq. inches, errors decreased on fugitive-spot control; above 25 sq. inches a deterioration in scoring occurred. Hand and foot movements are being analyzed to ascertain if variations in wave length and amplitude of movement occur with changes in the display area. (AD abstract)

1290

Day, R. H. 1953b

REACTION TIMES DURING A DIFFICULT TRACKING TASK. -- Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 845, Aug. 1953. 4 p. AD 30 747 UNCLASSIFIED

Secondary-task performance variations which resulted from the various display conditions of a main task were investigated. The main task (upper part of the display) consisted of controlling a fugitive spot of light by compensating, with joy-stick and rubber-bar controls, for a complex input. The secondary task involved switching off a red and a white light by using a lever switch operated by the subject's left hand. For each of three experiments, the response times to the two lights varied very little with changes in the area of the upper part of the display. The significance of the differences between means was examined by using the t ratio; none of the differences reached significance at the 5% level or better. Varying the area of the upper part of the display caused considerable changes in the performance efficiency of the main task. An examination of the sequence of 14 left-hand responses indicated that no significant variation in response times was present from one response to a following response. (AD abstract)

1291

Deese, J., and E. Ormond 1953

STUDIES OF DETECTABILITY DURING CONTINUOUS VISUAL SEARCH. — Johns Hopkins Univ., Baltimore, Md. (Contract AF 33(038)-22642); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-8, Sept. 1953. vii+48 p. RDO no. 694-45 and 694-43). AD 24 214 PB 113110

This report describes a series of experiments on visual search. The task employed in these experiments was a search for isolated targets that appeared from time to time on a single sweep of a Plan Position Indicator-type cathode ray tube. A number of variables were studied, of which perhaps the most significant is the rate at which targets appear. Probability of detection was studied for different average rates of target appearance. The results clearly showed that low rates of target presentation produce a very much lower probability of detection than do high rates. Targets presented at the average rate of 10 per hour are detected about 66% of the time or less, whereas targets presented at an average rate of 40 per hour are detected about 90% of the time or more. There is every reason to believe that lower rates of target appearance would produce even lower probability of detection. This fact, in conjunction with a finding of no relationship between inter-target time interval and detection (or the possibility of a positive one rather than the predicted negative one), leads to the formation of a hypothesis of level of search behavior in terms of expectancy. A number of other variables were studied, including the observer's knowledge of length of search period and the actual length at search. Different lengths of search produced different curves of probability against time at search. These different curves all had about the same average value, however. (Authors' abstract)

1292

Deese, J., R. S. Lazarus, and J. Keenan 1953a

ANXIETY, ANXIETY REDUCTION, AND STRESS IN LEARNING. — Jour. Exper. Psychol., 46 (1): 55-60. 1953. DLC (BFI. J6, v. 46)

Reprint issued also as: Johns Hopkins Univ., Baltimore, Md. (Contract AF 33(038)-22624);

issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-56, Dec. 1953. AD 22 307 UNCLASSIFIED

Ninety subjects divided into three groups were administered a nonsense-syllable learning test: Group I (control group) performed the test under no added stress; Group II was forewarned that each wrong answer would be followed by an electric shock; and Group III was informed that shock may be expected for right and wrong answers alike. Discrepancies of learning progress between high-scoring and low-scoring subjects were greater in Group II than in Group III, and still more so than in Group I. These discrepancies cannot be accounted for entirely in terms of anxiety as a drive (improved performance of the "anxious" group), but rather must be interpreted in terms of a decrement in performance on the part of the "nonanxious" group. Thus anxiety cannot be interpreted as a primary drive.

1293

De Graeve, J. H. 1953
INVESTIGATION INTO THE EFFECT OF FATIGUE ON THE SPEED OF PERCEPTION. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC/Memo 42, April 1953. 2 p. AD 40 376 UNCLASSIFIED

Speed of visual perception was measured by means of a perception tachometer on Royal Air Force Crew members of six Lincoln planes engaged in a 17-hour-long practice raid. Perception speed was recorded (both from near to far, and from far to near) before the beginning and following termination of the mission. No significant change in the speed of visual perception was observed.

1294

De Groot, S. G., 1953
J. M. Dodge, and Jo Ann Smith
FACTORS IN NIGHT VISION SENSITIVITY. III. THE INTERRELATION OF SIZE, BRIGHTNESS, AND LOCATION. — Naval Medical Research Lab. New London, Conn. Report no. 234 (vol. 12, no. 19), Sept. 14, 1953. iii+13 p. (Project Report no. NM 003 041.09.05). AD 24 342 PB 113105

The interrelation of size, brightness, and location of a stimulus of extended duration was measured at the minimal scotopic sensitivity of the eye. Limens were determined at four distances from fixation on four radii, up, down, nasal, and temporal, with brightnesses between 25 mμL and 125 mμL and sizes between eight and twenty-five minutes visual angle diameter. Size-brightness relation changes with distance from fixation in all directions. Scotopic sensitivity depends upon and must be expressed in terms of the three parameters— size, brightness, and location in the visual field. (Authors' abstract)

1295

De Haven, H. 1953
DEVELOPMENT OF CRASH-SURVIVAL DESIGN IN PERSONAL, EXECUTIVE AND AGRICULTURAL AIRCRAFT. — Cornell Univ. Medical Coll. Crash Injury Research, New York. May 1953. iv+21 p. (Contract N6onr-264-12). AD 15 100 UNCLASSIFIED

The designs of the CAA-Texas A and M agricultural plane, the Beech Bonanza and Twin-Bonanza, the Helioplane Courier, and the Meyers 145 are discussed in detail. The various methods by which manufacturers have improved these models to provide more complete crash protection for pilots and passengers are described. The appendix contains a reprint from Aviation Week, March 13, 1950, on how lighter planes can be made safer. (AD abstract)

1296

De Haven, H., 1953a
B. Tourin, and S. Macri
AIRCRAFT SAFETY BELTS: THEIR INJURY EFFECT ON THE HUMAN BODY. — Cornell Univ. Medical Coll. Crash Injury Research, New York. July 1953. vii+55 p. (Contract N6onr-264-12). AD 14 643 UNCLASSIFIED

An examination was made of the injuries sustained by 1039 survivors of 670 light-plane crashes. Statistical analyses were made to relate the use of the belt to body injuries of survivors. Safety belts were shown to be an infrequent cause of injury and to serve as effective protection. Severe snubbing action of safety belts as seen in 80 cases showed no significant correlation with the occurrence of intra-abdominal and lumbar spine injuries; these injuries appeared related to each other and to vertically acting forces. Bruises and minor contusions, however, were usually attributable to safety belts. Injuries which occurred without any signs of snubbing were due to jolt loads transmitted by supporting structures and seats. Injuries of the upper and lower torso were associated with and increased by failure of safety-belt installations. The percentage of all trunk injuries sustained by users and nonusers of safety belts was similar. No increased frequency was observed in injuries to the torso, neck, and spine by the use of the belt. Survivors not using safety belts suffered more serious injury than those that used them. Upper and lower torsoinjuries were also related to failure of belt installations. Dangerous-to-life injuries of head and body were associated with, and increased by, vertical crash forces. (AD abstract)

1297

DeHaven, H. 1953b
REARWARD- AND FORWARD-FACING SEATS. — Aeronaut. Eng. Rev. 12 (3): 40-1. 1953. DLC (TL501.A326, v. 12)

An investigation of commercial aircraft accidents has not given clear evidence that rearward-facing seats are safer for passengers than for-

ward-facing seats. Apparently there have been only a few accidents of aircraft using rearward-facing seats. The information at present indicates that good forward-facing seats will take care of passengers except in unusual incidents.

1298

Dennis, W. 1953
AGE AND BEHAVIOR: A SURVEY OF THE LITERATURE. — American Inst. for Research, Pittsburgh, Pa.; issued by School of Aviation Medicine, Randolph Field, Tex. May 1953. v+146 p. (Project no. 21-0202-0005, Report no. 1).
AD 15 634 PB 110730

A survey was made of the literature concerning psychological changes associated with age to obtain information for use in determining psychological fitness for work and in planning research in aviation medicine. The material is discussed in relation to social behavior and personality, mental abilities and mental achievements, psychomotor abilities and skills, sensory and perceptual abilities, and an evaluation of present knowledge. (AD abstract)
193 references.

1299

Desoutter, D. 1953
"FEEL" AN ISSUE IN COMET CRASH. — Aviation Age, 20 (2): 62-65. 1953.
DLC (TL501.A8187, v. 20)

The crash of the Comet, model Mark I, near Calcutta, India, on May 2, 1953, has been attributed to a primary structural failure. Bending of the spars of the elevators was a contributing factor to the subsequent down-load on the tail plane which resulted in a fuselage failure at one of the bulkheads. Apparently the co-pilot responded to a sudden down-gust of air by half closing the throttles while the pilot pulled the plane up (all 4 throttles were found to be half open), but the sudden elevator failure caused the wings to break due to the overload. The question is raised as to whether the pilot had enough "feel" in his power-actuated controls to be able to tell that he was putting too much stress on the elevators in attempting to raise the nose of the plane in the down-gust. Previous Comet crashes due to a high take-off angle would tend to substantiate the theory that the powered controls do not give the pilot sufficient "feel" of his craft.

1300

Diamond, A. L. 1953
FOVEAL SIMULTANEOUS BRIGHTNESS CONTRAST AS A FUNCTION OF INDUCING- AND TEST-FIELD LUMINANCES. — Jour. Exper. Psychol., 45 (5): 304-314. 1953.
DLC (BF1.J6, v. 45)

Simultaneous brightness contrast is investigated in the fovea as a function of the inducing- and the test-field luminances. The inducing and the test fields are adjacent squares, each subtending 33' on a side, and presented to the subject's right eye. A match field of equal size is presented to the subject's left eye. The subject's task is to set the luminance of the match field so that its brightness appears equal to that of the test field. As the inducing field is varied in luminance from below to above that of the test field, the apparent brightness of the test field, and thus the contrast effect, is measured by the actual luminance of the match field. The results show the contrast function to be of the following nature: The test-field apparent brightness is depressed only slightly for inducing-field luminances less than that of the test field. For inducing-field luminances greater than that of the test field the depression of the test-field apparent brightness seems directly proportional to the luminance of the inducing field. Thus, a "bend" in the function occurs when the inducing-field luminance is approximately equal to that of the test field. This relation is consistent over a large range of test-field luminances. (Author's abstract, modified)

1301

Dickson, E. D. D., 1953
R. Hinchcliffe, and L. J. Wheeler
INVESTIGATION INTO THE HEARING EFFICIENCY OF THE CREWS OF SHACKLETON AIRCRAFT. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 858, Dec. 1953. 22 p. AD 39 217 UNCLASSIFIED

The hearing loss for speech after a long operational flight in the Shackleton Mk-1 aircraft was calculated by determining the difference between the preflight and postflight audiometric audiograms of 34 members of Shackleton crews. Each of the members had a temporary hearing loss after a 10- to 15-hour flight, with the degree of loss varying with the person. Calculations by Fowler's method indicated that the modal hearing loss for the group was 19 db. and the mean loss was 17 db. (with a standard deviation of 8.1 db.). Observations indicated that the total recovery of hearing might take four days. Examination of the 169 preflight audiometric readings revealed that more than 10% of the aircrews had a permanent high-tone loss greater than 20 db. (AD abstract)

1302

Dickson, E. D. D. 1953a
SOME AVIATION PROBLEMS RELATED TO THE EAR AND SINUSES. — Medical Press (London), 229 (8): 164-167. 1953. DNLM

General physiological and medical concepts of barotrauma (acute aerotitis media) and of acoustic trauma are outlined. The syndrome associated with barotrauma of the ear occurs most frequently during descent, occasionally, during ascent. Barotrauma may or may not be due to permanent or temporary pathological conditions. Barotrauma of the sinus is usually associated with the frontal and maxillary sinus. All chronic respiratory conditions should be corrected before intended flight. --- Acoustic trauma may be either acute or cumulative. Individual susceptibility to noise varies

and depends upon age, heredity, previous occupation, and past illnesses. The control of noise, either at the source or by soundproofing, seems to be the most effective method of preventing acoustic trauma.

1303

Dickson, E. D. D., and L. J. Wheeler 1953b
THE R. A. F. MOBILE HEARING RESEARCH UNIT. — Nature (London), 172 (4382): 748-749. Oct. 24, 1953. DLC (Q1. N2, v. 172)

The article describes a mobile research unit used to test the hearing of aircrews within a few minutes of alighting from aircraft thus allowing standardization of test conditions. A two-compartment unit consisting of an anteroom and a test chamber is mounted on a 7-ton Bedford general-service chassis of sturdy construction. Entrance to the test chamber is gained through a double door. Test subjects are observed through sealed plate-glass double windows and may communicate with the observer in the anteroom by using a Morse key. An audiometer, developed by the R. A. F. Central Medical Establishment, is installed in the anteroom. It is of the pure-tone type and is powered (as all other equipment) by aircraft starter batteries mounted on a platform between the testing unit and the vehicle.

1304

Dickson, E. D. D. 1953c
SOME EFFECTS OF INTENSE SOUND AND ULTRASOUND ON THE EAR. — Proc. Roy. Soc. Med., (London), 46 (3): 139-148. 1953. DLC (R35. R7, v. 46)

Intense sound is defined by the author as a sound above 120 db. which stimulates senses other than hearing and causes discomfort to the ear. Ultrasound frequencies are considered as being over 20, 000 c. p. s. It is concluded that noise of long duration and high intensity can impair hearing, at first reversibly and later irreversibly. Data based on observations of aviators, riveters, etc., show that impairment of hearing is a gradual process, and that certain frequency ranges are particularly affected. The author feels that further experimental work on the hazards of airborne ultrasonic vibrations is necessary.

1305

Digman, J. 1953
THE INFLUENCE OF EARLY MASSING OF PRACTICE ON FINAL LEVEL OF PERFORMANCE OF A MOTOR SKILL [Abstract]. — Amer. Psychologist, 8 (8): 342. 1953. DLC (BF1. A55, v. 8)

The effects of early massing on terminal performance of a rotary pursuit skill was tested in 41 female subjects distributed into three experimental groups which had the following distinctive features: Group A – 5 minutes and 20 seconds practice with no rest; Group B – 16 trials of 20 seconds each, separated by 10-second rests, with a 5-minute rest following every fourth trial. In addition, all groups received 4 initial trials of 20 seconds each, separated by 10-second rests. After Trial 20, all groups were given 30 additional trials of 20 seconds each, separated by 10-second rests with a 2-minute rest at the end of every second trial. A week intervened between Trials 30 and 31. While the three groups differ considerably and significantly on Trial 21, the size of these differences decreases very rapidly. When the means of the three groups are adjusted for differences in initial ability, the differences on Trial 30 are slight. Following the one-week interval, performance levels of the three groups are virtually identical on the first recall score, on the sum of Trials 46-50, and on the sum of Trials 31-50. (Author's abstract, modified)

1306

*Diligenskaĭa, E. S. 1952
[FUNCTIONAL STATE OF THE CARDIO-VASCULAR SYSTEM IN THE AIR-TRANSPORT STAFF OF THE STATE AIR LINES] Funktsional'noe sostoianie serdechnososudistoĭ sistemy u lits letno-pod"emnogo sostava Gosudarstvennogo Vozdushnogo Flota. — Meditsina na vozdushnom transporte (Moskva), 3: 52-56. 1952. In Russian.

The cardio-vascular system in the large majority of air-transport personnel of the State Air Lines (G. V. F.) was in good condition. During a prolonged period of observation no negative influence of flying on the cardio-vascular system could be detected in elderly subjects after 12, 000 hours of flight. A special method of examination has been developed, consisting in (1) an electrocardiogram following performance of physical work at 5000 m. simulated altitude; (2) an orthostatic test; and (3) capillaroscopy before and after altitude exposure. In a small group of air transport personnel suffering from various degrees of hypertonia this test revealed good condition of the cardio-vascular system and of the coronary circulation. This is largely the result of prophylactic measures applied in the airlift staff of the G. V. F. throughout an entire summer's working time. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Vnutr. bolezni. (Moskva), 1953 (13): 53. DNLM (ZW1. qS729)]

1307

Di Macco, G. 1953
(RESISTANCE TO HYPOXIA, AND SURROUNDING TEMPERATURE) Resistenza all'ipossia e temperatura ambientale. — Rivista di medicina aeronautica (Roma), 16 (4): 475-481. 1953. In Italian, with English, French, Spanish, and German summaries (p. 480-481). DLC (TL555. A1R5, v. 16)

The influence of ambient temperatures on resistance to anoxia in guinea pigs was investigated. Two hundred guinea pigs were exposed to a simulated altitude of 8, 000 meters at various temperatures, ranging from 8°C. to 28°C. Resistance to anoxia, was measured in units of time expired

until collapse, and plotted against temperature. The results show that resistance decreases with increasing temperature. In an attempt to explain the underlying physiological mechanism the adrenergic character of the reflex mechanism is stressed, in contrast to the cholinergic character of counteracting metabolic processes which are coordinated by diencephalic regulatory centers.

1308

Diringhofen, H. von 1953
[PERSPECTIVES OF PRESENT-DAY AVIATION MEDICINE] Perspektiven der heutigen Luftfahrtmedizin. — Müchner medizinische Wochenschrift (München), 95 (49): 1317-1320; 1349-1352. 1953. In German. DNLM

The chief problems of modern aviation medicine are reviewed, with particular regard to high-speed and high-altitude flight. The following aspects are discussed: (1) tolerance of and protection against acceleration; (2) time of useful consciousness after explosive decompression; (3) biological effects of cosmic rays; (4) impairment of visual perception; and (5) physiological effects of high temperatures. It is concluded that the solution of these problems is contingent on judicious correlation and integration of physiological and technical studies.

1309

Dishoeck, H. A. van 1952
CONTINUOUS FREQUENCY AUDIOMETRY. — Acta oto-laryngologica (Stockholm), 41 (1-2): 58-68. 1952. In English. DNLM

Since large hearing loss may exist in a very small area of the tonal scale, causing a so-called dip, the need of a more detailed audiogram has become urgent. A special audiometer has been constructed, presenting a compensation for the low and high tones, so that the mean zero isophon is represented by a straight line. This apparatus makes possible the recording of a continuous frequency audiogram with great accuracy in a very short time. Repeated curves of the same patient are always very similar in shape. An experimental acoustic trauma can be studied in an easy and exact way only by means of this audiogram. It was found that in comparing bone and air conduction recordings of the same trauma, the hearing loss is not located at the same frequency (heterotopy of the dips). The method facilitates the detection of small differences in the contralateral, unexposed ear. The vibration sense can be tested in the same way as the hearing sense. It was found that mild stimulations may cause a hearing gain; thus noise does not always damage the ear, but may as well stimulate the cochlea.

1310

Ditchburn, R. W., 1952
and B. L. Ginsborg
VISION WITH A STABILIZED RETINAL IMAGE. — Nature (London), 170 (4314): 36-37. July 5, 1952. DLC (Q1.N2, v. 170)

The influence of small eye movements upon visual acuity during fixation was investigated experimentally. An image was beamed on a mirror, fitted on the test subject's eye by means of a contact lens, and hence reflected on a screen. The optical system was arranged in such a manner that compensation of horizontal eye movements occurred resulting in a stationary retinal image. The test object was divided into two fields of adjustable brightness. It was shown that, at intervals of about one minute, the contrast threshold was higher in the stabilized than in the normal eye for a few seconds. It is assumed that between these occurrences, some adjustment takes place which counteracts the effects of stabilization.

1311

Dixon, F., 1953
and J. L. Patterson
DETERMINATION OF ACCELERATIVE FORCES ACTING ON MAN IN FLIGHT AND IN THE HUMAN CENTRIFUGE. — Naval School of Aviation Medicine, Pensacola, Fla. July 1, 1953. xvi+225 p. (Project Report no. NM 001 059. 04. 01).
AD 39 383 UNCLASSIFIED

Chapter I: The concepts of force and acceleration are discussed. Physical units and coordinate systems are also covered. — Chapter II: The external force patterns acting on man in flight and in the human centrifuge are treated. Methods are given for calculating the magnitude and direction of the resultant external force in various types of airplane maneuvers — Chapter III: A classification of centrifuge types is presented along with analyses of characteristic external force patterns which can be simulated. — Chapter IV: The concept of apparent physiological force is introduced. Theoretical considerations are presented which show that the application of simple relativity principles permits the straightforward force analysis of classical physics to be applied to the biological organism considered as the reference frame. —Chapters V and VI: Formulas are derived for the physiological force patterns which act on man in flight and in the human centrifuge. — Chapter VII: A discussion of acceleration-measuring instruments is presented, with special emphasis on inertial-type linear accelerometers. — Chapter VIII: Methods are given for converting force components which are readily determined along the axes of the structures supporting man in flight and in the centrifuge, into force components along defined physiological axes through a subject. (AD abstract)

1312

Döbeln, W. von 1953
[VISUAL REQUIREMENTS OF MILITARY AIRMEN] Fordringer pa ogonens funktion hos militarflygare. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (1): 1-10. 1953. In Swedish. DNLM (W1.SW387, v. 2)

The Swedish Air Force has set up a number of stringent requirements to be incorporated in the tests for visual acuity which must be passed by

the applicants for pilot training. Tests for ametropic conditions, such as near-sightedness and far-sightedness as well as astigmatism, are standard procedures. Included also are tests to determine the degree, type, and causes of heterophoria. Furthermore, the candidates are tested for depth perception, field of vision, dark adaptation, and color vision.

1313

Döbeln, W. von 1953a
[WORK CAPACITY TESTS IN HEALTH EXAMINATION] Arbetsprov vid halsokontroll. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (4): 14-15. 1953. In Swedish.
DNLM (W1.SW387, v. 2)

Aviators are given periodic checkups, which show the effects of aging and the general condition of the subject, as well as detecting any incipient pathology in the respiratory and circulatory system. A bicycle ergometer is used for the testing. At each stage of the test, the subject does 50 steps per minute for 6 minutes without rest periods. The wheels controlling the movements of the treads are progressively tightened, increasing the work load of the subject from 600 kg./min. to 1,200 kg./min. The pulse is counted for 15 seconds at the end of each minute; if, at a work load of 600-900 kg./min., the pulse exceeds 150 beats per minute, the subject is disqualified.

1314

Doesschate, G. T. ten 1953
[RESULTS OF AN EXAMINATION OF "NORMAL" EYES] Resultaten van het onderzoek van "normale" ogen. — Aeromedica acta (Soesterberg, Netherlands), 2: 141-155. 1953. In Dutch.
DNLM

Visual performance tests were made on 1000 healthy young applicants for pilot training, and the results tabulated for statistical purposes.

1315

Doesschate, G. T. ten 1953a
[DEPTH PERCEPTION AT A GREAT DISTANCE] Diepte-onderscheidingsvermogen op grote afstand. — Aeromedica acta (Soesterberg, Netherlands), 2: 157-167. 1953. In Dutch, with English summary (p. 167).
DNLM

Investigation was made to what degree of accuracy a subject can perceive depth variations at a considerable distance by using exclusively a binocular parallax. An apparatus with 3 rods placed at 50 m. from the subject was used to test the depth discrimination capacity of about 1000 young men with normal eyesight. The average error was found to be approximately 1 meter. Obviously, the binocular parallax, exclusive of the effects of other third-dimension clues, enables the subject to judge the range with a considerable degree of correctness at this great distance. No appreciable correlation could be found between the discriminatory power at 6 or 50 m. distance. At the greater distance, expert flyers were found to make errors which were not smaller than those of inexperienced persons. (Author's abstract, modified)

1316

Doesschate, G. T. ten 1953b
[HETEROPHORIA AT A DISTANCE OF 50 METERS] Heterophorie bij een afstand van 50 meter. — Aeromedica acta (Soesterberg, Netherlands), 2: 169-181. 1953. In Dutch, with English summary (p. 175).
DNLM

Examination of 200 cases showed that the degree of heterophoria is very often altered when the subject first fixes a light at a distance of 6 m. and then at a distance of 50 m. (Author's abstract, modified)

1317

Dolch, J. P. 1953
AN INVESTIGATION OF SOME PHASE AND INTENSITY RELATIONSHIPS IN THE INTERFERENCE OF BONE- AND AIR-CONDUCTED SOUND. — State Univ. of Iowa, Iowa City. Supplementary Report no. 2, Aug. 1953. iv+6+85 p. (Signal Corps Contract no. DA 36-039-sc-42562). AD 20 349
UNCLASSIFIED

An apparatus was designed and constructed to provide three separate pure-tone channels of exactly the same audio frequency with independent phase and amplitude controls in two of the channels. A method of phase shifting was developed to provide continuously variable phase shifts of 360 degrees with substantially no variation in the amplitude of the audio signal output. This method allowed a single calibration of the phase shifter for any desired audio frequency output. By adjusting the phase and intensity of air-conducted tones at each ear, subjects were able to completely cancel a bone-conducted tone. In all of the experiments the bone conduction receiver was placed in the middle of the forehead. Frequencies from 250 to 8000 c.p.s. were canceled at bone conduction sensation levels up to 45 db. in the mid-frequency range. A secondary purpose of this investigation was to explore the possibilities of utilizing this cancellation phenomenon to improve interphone communication and afford ear protection in high-level ambient noise. (From the author's abstract)

1318

Domanski, T. J. 1953
PHYSIOLOGICAL RECOGNITION OF STRAIN IN FLYING PERSONNEL: EOSINOPENIA IN F-86 COMBAT OPERATIONS. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+25 p. (Project no. 21-1208-0005, Report no. 2). AD 20 375
UNCLASSIFIED

Cases of recognizable combat stress encountered by F-86 pilots in Korea are discussed with respect to pre- and postflight blood eosinophil counts. Data from 19 missions flown by 16 pilots suggested that eosinopenia (decrease in eosinophil count of 50% or more) following a combat mission

involving no air-to-air combat was limited to combat pilots judged by supervisory flying personnel to be weak or very weak in combat performance. The absence of eosinopenia following combat missions involving air-to-air combat was limited to average, better than average, and superior combat pilots. (AD abstract)

1319

Domanski, T. J. 1953a
PHYSIOLOGICAL RECOGNITION OF STRAIN IN FLYING PERSONNEL: EOSINOPENIA IN B-29 COMBAT OPERATIONS. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. 1+20 p. (Project no. 21-1208-0005, Report no. 3).
AD 32 821 UNCLASSIFIED

The occurrence of eosinopenia in B-29 aircrew personnel flying combat missions over Korea was investigated. The aircraft commander, navigator, radar observer, bombardier, and engineer of each of five crews were studied with respect to a total of 55 man-missions. Post-flight data were obtained for 45 of the man-missions concerned. The data include findings relative to an aircrew flying its first combat mission. The incidence of eosinopenia during the flight phase was circa 20%. This value appears to be consistent with the relatively mild stress associated with the air operations described. (From the author's summary and conclusions)

1320

Domanski, T. J., and J. B. Nuttall 1953b
THE PHYSIOLOGICAL RECOGNITION OF STRAIN ASSOCIATED WITH FLYING. — Jour. Aviation Med., 24 (5): 441-445. 1953.
DLC (TL555.A1A4, v. 24)

A physiological test, based on the relationship between mental stress and eosinopenia, was developed to detect strain associated with flying. Eosinopenia is defined as a decrease in the blood eosinophil count of more than 50%; a count of 40 cells per cubic millimeter constitutes eosinopenia. In flying personnel, eosinopenia seems to be associated with mental rather than muscular stress. Eight pilots and their two instructors were examined for statements regarding stress situations; each subject identified the stress associated with his respective missions. A post-flight eosinophil count was done after each mission; a positive correlation was found between eosinopenia and the occurence of strain in the pilots.

1321

*Domontovich, E. N. 1952
[CHANGES IN DIFFERENT ASPECTS OF METABOLISM IN THE BRAIN TISSUE DURING OXYGEN WANT, AND THE EFFECTS OF ACCLIMATIZATION] Izmenenie nekotorykh storon obmena veshchestv mozgovoĭ tkani pri kislorodnom golodanii i rol' faktora adaptatsii. — In: Kislorodnaîa terapiîa i kislorodnaîa nedostatochnost', p. 14-20. (Kiev), 1952. In Russian.

A study was carried out of the glycogen, the adenosintriphosphoric (ATF) and the creatinphosphoric acid content in the brain tissue, the heart muscle, and the liver of rabbits during anoxia induced by elevation to a simulated altitude of 8,500-10,000 m. for 6-12 hours. Altitude acclimatization was produced by repeated elevation to 6000 m. The brain tissue is characterized by a very high sensitivity to anoxia. In anoxic anoxia the oxygen supply of this tissue appears to be insufficient, despite a compensatory increase in brain circulation; consequently, the anaerobial processes are augmented, resulting in an increase in lactic acid content. Disturbance of the oxydizing resynthesis is accompanied by a decrease in basic energy sources of the brain tissue, mainly in ATF. The glycogen content decreases simultaneously. In the heart muscle and in the liver, a 6-hour period of anoxia does not produce such pronounced alterations; however, a noticeable decrease in glycogen content takes place in the liver. During the 12-hour anoxic period the ATF content in the heart muscle and the glycogen content in the liver diminished noticeably. Repeated altitude exposures induced further symptoms of acclimatization: central nervous changes became more moderate, while a relative stabilization of the content in basic energetic substances of the brain tissue was observed. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (14): 43. DNLM (ZW1.qS729)]

1322

Donald, K. W. 1952
A. Renzetti, R. L. Riley, and A. Cournand
ANALYSIS OF FACTORS AFFECTING CONCENTRATIONS OF OXYGEN AND CARBON DIOXIDE IN GAS AND BLOOD OF LUNGS: RESULTS. — Jour. Applied Physiol., 4 (7): 497-525. 1952.
DLC (QP1.J72, v. 4)

The disturbances of gas and blood distribution in the lungs, and of the diffusion of gases across the respiratory membrane, have been studied in a number of patients with different pulmonary diseases by a method employing two distinct levels of oxygenation. Interference with the diffusion of oxygen across the respiratory membrane has been demonstrated in patients with so-called pulmonary fibrosis, who develop marked arterial desaturation on exercise, despite the absence of any ventilatory disability. The findings in the more severely affected patients in this group showed what appeared to be marked disturbances of blood and gas distribution, although no emphysema was present. It has been shown that the primary disorder in patients with pulmonary emphysema is the loss of the efficient distribution of blood and gas in the lungs. However, in the later stages of the disease, these disturbances of distribution, plus a reduction in the area of diffusing surface, cause a secondary impairment of the diffusing capacity. The significance and possible causes of these findings are discussed. (Authors' abstract)

1323

Dornhorst, A. C., 1953
and I. M. Young
RECORDING OF RAPID FLUCTUATIONS OF CO_2 IN RESPIRATORY GASES [Abstract]. — Jour. Physiol. (London), 119 (4): 33P-34P. 1953.
DLC (QP1.J75, v. 119)

The commercial Infra-Red CO_2 Analyser (Infra Red Development Co.) has been adapted for recording of rapid fluctuations by tapping the electrical output before it is rectified and smoothed for direct reading on the internal indicator. The signal is now rectified, but not smoothed, by an external circuit. When gases are drawn through the machine at rates of 10-30 ml./sec. the response to abrupt changes in CO_2 content is complete in about 0.4 sec. As demonstrated, part of the gases from the mouthpiece of a spirometer is drawn continuously through the analyser and returned to the spirometer; continuous sampling is thus possible without disturbing the measurement of the respired volume. (From the abstract)

1324

Dorny, L. R., 1953
J. W. Campbell, and R. C. Channell
STUDY OF HELICOPTER FLIGHT AND TACTICS TRAINING. — Dunlap and Associates, Inc., Stamford, Conn. (Contract Nonr-971 (00)); issued by Special Devices Center, Port Washington, N.Y. Human Engineering Report no. SPECDEVCEN 971-0-1, Aug. 24, 1953. vi+65 p. AD 120 153
UNCLASSIFIED

This report is based on a survey of helicopter flying in the U. S. Navy and Marine Corps, of the various tasks performed by helicopter pilots, of pilot training methods and programs, and of operational aspects. Helicopter trainees used to flying fixed-wing aircraft, experience some difficulty in adjusting themselves to rotary-wing flight controls, and to the relative instability of the helicopter in the air. Control of horizontal and vertical movements over the earth is complicated and obscured by the oscillations and revolutions of the fuselage, which occur independent of the flight path. Continuous attention and readiness for corrective control maneuvers is required, imposing additional stress on the pilot. Navy helicopter pilots must familiarize themselves with equipment characteristics for helicopter operations, such as the various types of gear utilized in the transfer of material or personnel in rescue operations. Rescue work also demands a familiarity with first-aid equipment and procedures. Bodily sensations related to fixed-wing aircraft flight are less discriminable in helicopters. During slow flight, meaningful g forces cannot be readily identified, and the pronounced vibrations mask skid or slip sensations. The prolonged vibrations add to the fatigue effect.

1325

Doust, J. W. L., 1952
and R. A. Schneider
STUDIES ON THE PHYSIOLOGY OF AWARENESS: ANOXIA AND THE LEVELS OF SLEEP. — Brit. Med. Jour. (London), 1 (4756): 449-455. 1952.
DNLM

It has been found that attention and awareness are related to arterial blood-oxygen saturations, and that there exists a parallelism between certain fatigue conditions and experimentally induced anoxic anoxia. The various planes of sleep (i.e., levels of awareness) were studied on seven subjects using EEG recordings with simultaneous measurements of percent oxygen saturation (continuous blood samples from the ear) and notations of muscular movements and of respiratory responses to external stimuli. Seven levels of sleep were associated with the following arterial blood oxygen saturations: 96% in wakefulness, 90-92% in pre-sleep, 89-91% in light sleep, 87-88% in deep sleep, 89-91% in light sleep following deep sleep, 90-92% in pre-wakefulness, and 92-98% in awakening. Electroencephalograms made during sleep were characteristic of records obtained when anoxic anoxia induced impairment of consciousness. The physiological phenomena associated both with sleep and anoxia are hypotension, bradycardia (after an initial tachycardia), hypothermia, depression of deep reflexes (at 6,600 ft. and 92% arterial blood oxygen saturation), stimulation of vasomotor reflexes, increased tonus of the stomach wall, and increased intensity of hunger pains. These considerations indicate an association of sleep processes and the physiological changes occurring in anoxia.

1326

Dowds, E. G., 1953
E. W. Brickner, and E. E. Selkurt
RENAL RESPONSE TO HYPERCAPNIA. — Proc. Soc. Exper. Biol. and Med., 84 (1): 15-20. 1953.
DLC (QP1.S8, v. 84)

Insight into the role of the kidney in the readjustment of disturbances in acid-base balance created by respiratory acidosis is required in order to determine whether the alteration in electrolyte excretion is due to direct tubular action or to changes in glomerular filtration rate which accompanies acidosis. Under conditions of progressive hypercapnia, standard renal clearance procedures were followed in eight dogs anesthetized with sodium pentobarbital and injected intravenously with creatinine, para-amino hippuric acid (PAH), and 10% mannitol. The mannitol was delivered at a rate of 1.2 to 2 ml. per minute. Urine samples were collected during the initial contiol period, during rebreathing, and,later,during the recovery stages. Rebreathing was effected by way of a segment spirometer attached to a tracheal cannula. Arterial blood samples were collected at 30-minute intervals. After an increase of 17.9 volume percent of arterial blood carbon dioxide had been produced in the dogs by having them rebreathe from a spirometer, urinary pH and sodium excretion decreased, the latter to 35% of the controls. Elevated hydrogen ion concentration of the blood apparently enhanced tubular reabsorption of sodium; potassium excretion also diminished. Plasma potassium and sodium increased during hypercapnia (due to renal retention or mobilization from intracellular compartments). Hyperventilation occurred for a time when breathing of room

air was resumed. This phase manifested a decrease in blood carbon dioxide, increase in urinary pH, and increase in potassium and sodium excretion beyond the controls.

1327

Dreher, R. E. 1952
THE DEVELOPMENT OF RATING SCALES FOR THE EVALUATION OF STUDENT AIR PERFORMANCE AT MATHER AIR FORCE BASE. — Human Resources Research Center. [Aircraft Observer Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. AO 52-2, April 1952. 6+4p. (Project no. 506-006-0005). ATI 168 879 UNCLASSIFIED

The Student Performance Rating Scale (SPRS) was developed as a means of providing an evaluation of aircraft observer (bombardment) air performance aspects which were difficult to ascertain with conventional flight check lists. "Word pictures" of students' performance written by their instructors as a supplement to the check lists were found to be inadequate and unreliable, and the SPRS was substituted for the word pictures. In deriving the items to be used for the scale, an analysis was first made of instructors' comments on the remarks section of the flight check grade sheets. The comments were sorted into categories based on the general nature of the comments. From these categories a preliminary draft of the SPRS was constructed. After an indoctrination of instructors in the use of the scale, it was used experimentally with a number of classes in the radar bombing and visual bombing programs at Mather Air Force Base. The results are still outstanding.

1328

Drenckhahn, F. O. 1953
[INVESTIGATIONS CONCERNING THE CHARACTERISTICS OF THE CORNEAL REFLEX DURING ACUTE ISCHEMIA AND ANOXIA OF THE RABBIT BRAIN] Untersuchungen zum Verhalten des Cornealreflexes bei akuter Ischaemie des Kaninchengehirns. — Pflügers Archiv für die gesamte Physiologie (Berlin). 257 (6): 436-453. 1953. In German. DLC (QP1.A63, v. 257)

The corneal reflex was elicited in rabbits by electric stimulation, which allowed for finer experimental control and induced lid paralysis twice as long (about 58 seconds) than mechanical stimulation. The animals were subjected to cerebral ischemia and to anoxia (breathing air mixtures containing 0.1-0.2% O_2 and 5% CO_2), and eye lid movements during the reflex action were recorded by means of a highly sensitive photoelectric registering device. The following two reaction phases were observed: (1) complete closing of the lid and rapid reopening completed within 25 to 35 seconds; and (2) partial and slower closing and opening of the lid, beginning 50 seconds and ending 100 seconds after the onset of stimulation. The animals went into a convulsive stage beginning 15 seconds and ending 40 seconds after the onset of stimulation. It is concluded that the two phases observed in the ischemic and anoxic states correspond to two "functional levels" in the central nervous system, the higher level being reflected in the first phase and the lower level in the second phase.

1329

Drooker, J. C. 1953
WARTIME EXPERIENCE WITH SKULL INJURY AND BLAST AND THEIR EFFECT UPON THE EAR. — A.M.A. Arch. Otolaryngol., 58 (5): 546-574. 1953. DLC (RF1.A7, v. 58)

A large section of this paper is dedicated to a review of the literature on acoustic trauma caused by blast waves. An analysis of blast wave fronts has revealed that a slowly rising front contains a greater portion of its energy in the low frequencies, while a sharply rising wave front has a greater portion of its energy in the higher frequencies. A steep rise causes greater irritation of the cochlea toward the round window, a slow rise causes irritation near the apex of the cochlea. An advancing wave front is uneven, so that objects at distances equally close to the point of detonation may be exposed to various pressures. The idea has been advanced that the inner ear be protected from extensive damage by the dissipation of the force of a blast resulting from rupture of the drum. Other authors contend, however, that inner-ear damage occurs before such rupture takes place, and that the severity of the cochlear damage is directly related to the intensity of the blast pressure. The latter assumption has been corroborated by experimental evidence. The final part of the paper is dedicated to a discussion of ear defenders.

1330

Duane, T. D., and J. E. Ziegler 1952c
HUMAN TOLERANCE TO COMBINED ACCELERATION. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADCMA-L5207 (Progress Report), Dec. 3, 1952. 8 p., 5 plates. (Project no. NM 001 060.10). AD 54 282 UNCLASSIFIED

Experiments were carried out on human subjects and primates (chimpanzees) seated in an F9F ejection seat, which was mounted on the deck of the gondola of a human centrifuge. Transverse g (back to chest and chest to back) were applied up to 15 g for 5 seconds, resulting in physical discomfort, such as pressure on the rib cage, and petachiae on the back. However, this body loading was well within the voluntary human tolerance limit. Application of g forces from back to chest and installation of a padded body support reduced discomfort. Following preliminary explorative experiments with primates, subjects were exposed to positive (head to seat) g forces up to a maximum of 15 g. The subjects were first tested under normal accelerations (3 to 4 g per second increase or decrease), in order to establish their blackout level, and then subjected to g levels higher than their blackout level. It was shown that by stepping up the acceleration levels, the blackout levels could be increased, while the time intervals of consciousness were reduced.

1331

Duane, T. D. 1953
PRELIMINARY INVESTIGATION INTO THE STUDY OF THE FUNDUS OCULI OF HUMAN SUBJECTS UNDER POSITIVE ACCELERATION. PHASE III. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville,

Pa. Report no. NADC MA-5303, July 1, 1953. v+60 p. (Project report no. NM 001 060.12.01). AD 20 519 UNCLASSIFIED

An analysis of the term "blackout" is presented. A review of the literature with reference to the two prevalent theories regarding this phenomenon is presented and it is noted that direct evidence to support either theory is lacking. In order to provide this needed evidence, an experiment was designed wherein the subject experienced positive g, while the observer was exposed to transverse g. Thus, an observer was able to study the fundus oculi ophthalmoscopically while subjects were undergoing blackout. The following direct correlation was established between subjective and objective findings.

SUBJECTIVE	OBJECTIVE
Stage I Loss of peripheral lights	Arteriolar pulsation
Stage II Blackout	Arteriolar exsanguination and collapse
Stage III Return of central and peripheral lights	Return of arteriolar pulsation and temporary venous distention

(Author's summary)

1332

Duane, T. D., 1953a
E. L. Beckman, J. E. Ziegler, and H. N. Hunter
SOME OBSERVATIONS ON HUMAN TOLERANCE TO EXPOSURES OF 15 TRANSVERSE G. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-5305, July 30, 1953. iii+26 p. (Project Report no. NM 001 060.10.04). AD 20 518 UNCLASSIFIED

The physiological effects of positive and negative g applied transversely in supine and prone positions were investigated. The 50-feet human centrifuge with a standard F9E ejection seat was used in all the test runs. Normal, healthy, male volunteers experienced 99 runs between 3 g for 2 seconds and 15 g for 5 seconds in the supine position; 53 runs of the same magnitude were made in the prone position. Conventional lap belts and shoulder harnesses were used,and in the prone position thorax and leg barriers were applied. Head fixation was maintained by a perforated face curtain. Unconsciousness and blackout did not occur in either position but temporary vertigo, stiffness, and weariness were experienced by all subjects. Electrocardiogram, electroencephalogram, and ear opacity recordings were inadequate for satisfactory analysis. In the prone position, a slight sinus arrhythmia was present in some subjects during the postrun period, and petachiae appeared in the legs of subjects not protected by elastic bandages. In spite of the snugness of belts and harnesses motion pictures taken revealed body displacement, and the subjects felt burning pains in the knees and calves during 15-g runs. (AD abstract, modified)

1333

Duane, T. D. 1953b
A PLEA FOR THE INCLUSION OF THE COVER TEST FOR HETEROPHORIA IN ROUTINE FLIGHT PHYSICAL EXAMINATION. — Jour. Aviation Med., 24 (5): 425-428. 1953.
DLC (TL555.A1A4, v. 24)

The flight surgeon must be familiar with the most accurate and rapid tests available for the detection of any deviation from the normal positioning of the eyes. Of the several methods used, the Maddox rod test is most common. The Maddox test is a subjective test and is, therefore, susceptible to malingerers. It is suggested that this test be supplemented by an objective test, namely, the Cover Test. In the Cover Test the subject is asked to focus on a distant or near object while the examiner covers the eyes alternately with a card. If either or both eyes deviate from the normal position and yet quickly return to the normal axis when uncovered, the results indicate heterophoria.

1334

Dubois, A. B. 1952
ALVEOLAR CO_2 AND O_2 DURING BREATH HOLDING, EXPIRATION, AND INSPIRATION. — Jour. Applied Physiol., 5 (1): 1-12. 1952.
DLC (QP1.J72, v. 5)

Analyses are made of alveolar air samples obtained during the first 20 seconds of breath holding. The results are plotted on a P_{O_2}-P_{CO_2} diagram and an equation is derived for the exponential curve which results. The initial slope of this curve is shown to be less than the slope of the respiratory exchange or R line and from the difference it is possible to calculate the CO_2 combining capacity of the lung tissue and its contained blood. Analyses were made of the alveolar samples obtained immediately after diluting the lung gases by a large inspiration of air. This process is interpreted in terms of a theoretical dilution curve and a subsequent brief period of breath holding at the new volume. This dilution curve deviates slightly from the $\bar{R}$ line because of the CO_2 capacity of the lung tissue. Calculations of the variations in alveolar P_{O_2} and P_{CO_2} during a normal respiratory cycle indicate that the alveolar composition passes through a counterclockwise loop on the P_{O_2}-P_{CO_2} diagram. The expiratory limb of this loop corresponds to a short period of breath holding and the inspiratory limb corresponds to the dilution curve. This loop encloses but does not pass through the mean alveolar point. Mean alveolar P_{O_2} and P_{CO_2} are best represented by an alveolar sample shortly after mid-expiratory time. However no single sample can be expected to yield the exact mean of both gases at the same time. (Author's summary)

1335

DuBois, A. B. 1953
RESISTANCE TO BREATHING MEASURED BY DRIVING THE CHEST AT 6 C.P.S. — Federation Proceedings, 12 (1^{I}): 35-36. 1953.
DLC (QH301.F37, v. 12)

A Lilly flowmeter and capacitance manometer are placed between the mouth of the subject and a bellows pump of sinusoidal stroke 10 cc. (ATPS) and controllable frequency. At 6.2 c.p.s., the mean flow is .29 l./sec., and the mean pressure is 1.1 cm. H_2O, on 7 normal subjects. Peak pressure occurs with peak flow, and the reactance is negligible at this frequency. At 2.4 c.p.s., a phase lag of 34° occurs; above 10 c.p.s. a lead is encountered due to compression of air in the flowmeter and trachea. Pressures measured develop in overcoming airway resistance and tissue viscance, including transverse movement between regions of unequal phase of motion. (Author's abstract, modified.)

1336

DuBois, D. B. 1952
PROBLEMS ENCOUNTERED IN THE LOUDSPEAKER ADMINISTRATION OF THE SIGNAL CORPS CODE APTITUDE TEST. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-49, Dec. 1952. 25 p. (Project no. 503-001-0014). AD 7957 UNCLASSIFIED

The performance of basic airmen on the Signal Corps Code Aptitude test was determined in respect to relative location to the loud-speaker from which the test was administered. The testing arrangement was changed to minimize the undesirable influence on individuals far from the speaker. The changes included moving the speaker to an overhead position, raising the sound level, increasing the number of speakers, and obtaining better reproductions of the test. The revised situation improved, but did not eliminate, the effect of the speaker-to-subject position. The best arrangement still showed a difference of nearly one standard deviation between the means of near and far groups. (AD abstract)

1337

DuBois, P. H., 1953
and W. B. Webb
PERSONNEL FACTORS IN AIRCRAFT ACCIDENTS: DEVELOPMENT AND EVALUATION OF METHODS OF COLLECTING AND COLLATING PERTINENT DATA. — Human Relations Research Foundation, St. Louis, Mo. (Contract AF 33(38)-21915); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Report no. TR-54-3, Nov. 1953. vi+49 p. AD 49 625 PB 117051

This report presents the results of a survey of possible sources of information on personnel factors which might be related to aircraft accidents. Types of records currently available are discussed from the points of view of accessibility, ease of manipulation, retention within the Air Force records system, population coverage, and probable significance. A persistent problem in research on personnel factors in aircraft accidents has been the development of effective psychological codes to be applied to aircraft accident reports. A review of the literature and a series of studies on coding failed to bring to light a generally effective psychological coding system. For the collection of transitory information, such as morale or present attitudes towards environment, the approach through the flight surgeon apparently yields more positive responses than does the approach through operations. (From the authors' summary)

1338

Dugan, R. D. 1953
COMPARISON OF EVALUATION OF B-29 CREWS IN TRAINING AND IN COMBAT [Abstract] — Amer. Psychologist, 8 (8): 343-344. 1953. DLC (BF1.A55, v. 8)

Training criterion scores of twenty-nine B-29 crew members were evaluated on the basis of the following sources of data: (a) proficiency test, (b) peer ratings, (c) ratings of instructors, and (d) flight checks. The combat criterion scores were based upon ratings from superiors and from peers Both training and combat data were factor analyzed for crew position and correlated with each other. The highest correlations were found between proficiency test scores in training and peer ratings of proficiency in combat. For certain crew positions significant correlations were obtained between the proficiency test scores in training and superiors' ratings in combat. Some significant relationships were found between peer ratings in training and peer ratings in combat. No significant correlations were found between flight-check factor scores in training and any of the combat criteria. For certain crew positions it appeared that the specificity of the combat criteria tended to lower the relationships between the evaluations of training and combat performance. (Author's abstract, condensed)

1339

Duke, H. N., 1952a
and E. M. Killik
PULMONARY VASOMOTOR RESPONSES OF ISOLATED PERFUSED CAT LUNGS TO ANOXIA. — Jour. Physiol. (London), 117 (3): 303-316. 1952. DLC (QP1.J75, v. 117)

Isolated cat lungs were perfused through the pulmonary artery with the animal's own blood at constant volume inflow. Ventilation of the lungs with pure CO or 1-20% CO in air (instead of air) constantly produces a fall in pulmonary arterial pressure usually accompanied by bronchodilatation. The response to CO is not inhibited by atropine, dihydroergotamine or decamethonium iodide, and it is not accompanied by significant changes in blood pH. The vasomotor responses to CO and N_2 can both be produced during perfusion of the lungs with Dextran; and it is probable that it is the change in tension of the gas in the blood or alveolar air which is important. Since the response to N_2 can be superimposed upon that to CO it is suggested that the mechanism of the two effects must be different. (From the authors' summary)

1340

Duke, H. N., 1952b
and E. M. Killick
PULMONARY VASOCONSTRICTION TO ANOXIA:

ITS SITE OF ACTION [Abstract]. — Jour. Physiol. (London), 117 (4): 78P-79P. 1952.
DLC (QP1.J75, v. 117)

Two pairs of cat lungs were set up and perfused with separate pumps. Arrangements were made so that the lungs could be perfused in series, the venous outflow from each lung being pumped into the pulmonary artery of the other. When one lung was ventilated with N_2 the other lung received deoxygenated blood through its pulmonary artery. If the second lung was ventilated with air the blood was oxygenated within it so that the first lung received oxygenated blood, which it deoxygenated, completing the cycle. It was found that perfusion of a lung with deoxygenated blood did not cause a rise in perfusion pressure when it was ventilated with air. Ventilation of a lung with N_2 during perfusion with either oxygenated or deoxygenated blood did, however, cause a rise of perfusion pressure. The level of the pulmonary arterial pressure thus appears to be independent of changes in oxygen tension of the arterial blood and is dependent on changes in oxygen tension in the alveolus or in the venous blood. (From the abstract)

1341

Du Monceau de Bergendal 1953
[FATIGUE IN FIGHTER PILOTS] La fatigue du pilote de chasse. — Medecine aeronautique (Paris), 8 (4): 331-332. 1953. In French.
DLC (TL555.M394, v. 8)

When fatigue in fighter pilots is being evaluated, the following factors have to be considered: (1) the principle component which is of a mental nature (handling of precision instruments at high altitudes); (2) the emotive and nervous factor due to waiting (half an hour of "cockpit-standby" is a good illustration of this point); and (3) the physical factor (extreme acceleration, rapid changes in altitude, occasional oxygen deficiency are all responsible for this condition). This latter condition can be easily remedied by sleep. — In order to keep a fighter pilot in good shape, it has to be remembered that: (1) his mental fatigue should be counter-balanced by physical fatigue induced by regular light sport activities; (2) his morale should be kept at high level; and (3) he has to have sufficient sleep and rest.

1342

Duncan, C. P., 1952a
and B. J. Underwood
TRANSFER OF TRAINING IN MOTOR LEARNING AS A FUNCTION OF DEGREE OF FIRST-TASK LEARNING AND INTER-TASK SIMILARITY. — Northwestern Univ., Evanston, Ill. (Contract AF 33(038)-11396); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-64, April 1952. vi+37 p. (RDO no. 694-44).
ATI no. 172 519 PB 108129
Also condensed as: TRANSFER IN MOTOR LEARNING AS A FUNCTION OF DEGREE OF FIRST-TASK LEARNING AND INTER-TASK SIMILARITY. — Jour. Exper. Psychol., 45 (1): 1-11. 1953. DLC (BF1.J6, v. 45)

Transfer between a first and a second task, both available on the same piece of equipment, was studied as a function of degree of learning of the first task and of degree of similarity between tasks. It was found that acquisition of the second task was facilitated by practice on the first task, and that the facilitation increased directly with degree of first-task learning. Positive transfer also occurred with all degrees of inter-task similarity, and increased directly as similarity increased. Differential positive transfer resulting from variation of first-task learning lasted throughout all 60 acquisition trials on the second task. Some forgetting of the second task was present after a 24-hour rest; the forgetting neither varied as a function of the two main variables nor was attributable to their presence. Relearning of the second task was facilitated by practice on the first task, and the facilitation varied directly with the amount of practice. (From the authors' abstract)

1343

Duncan, C. P., 1953
and B. J. Underwood
SPATIAL ERROR GRADIENTS IN MOTOR LEARNING AND TRANSFER. — Northwestern Univ., Evanston, Ill. (Contract AF 33(038)-11396); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-65, April 1953. iv+11 p. (RDO no. 694-44). AD 13 029
PB 109900

Learning of, and transfer between, two perceptual-motor paired-associates tasks were studied by means of a detailed examination of errors. It was found that as a result of practice on the training task there developed a gradient of errors among the responses within the task. The gradient was based upon spatial response similarity; the more similar an error response was to the correct response, the more frequently did it occur as an error. These considerations held only for the first error made to each stimulus; there was no gradient among subsequent errors. Upon transferring to the second task the error gradient was greatly distorted by the tendency to make, as an error, the response that was previously correct on the training task. As practice on the transfer task continued, there was some tendency for the original error gradient to become re-established. Errors decreased with practice but the rate of decrease was slower for the error of returning to the formerly correct response. These results show the need for having the arrangement of equipment in training simulators as similar as possible to the arrangement of operational equipment for which the operator is being trained. (From the authors' abstract)

1344

Dye, F. C. 1953
PRE- AND POSTOPERATIVE CARE IN AIR FORCE HOSPITALS. — Southern Med. Jour.,

46: 615-617. June 1953. DLC (R11.S68, v. 46)

A description of a pilot model "crash ward" for accident victims is given. The ward consists of two private rooms, space for thirty-five ward beds with one-half of the number in glass partitioned cubicles, and two "prep" rooms for surgery. The ward is in close proximity to operating rooms and is easily accessible to the ambulance entrance. All patients, except those in the private rooms, are visible to the nurse at all times. A central oxygen room containing oxygen tanks and other equipment necessary for postoperative patients is available to the ward. Pre-operative patients are transferred to the ward the day before the operation is scheduled. During the postoperative period the patients are cared for by corpsmen, who are under the supervision of graduate nurses. The use of centralized equipment and trained personnel is thought to have reduced greatly the incidence of morbidity and mortality.

1345

*Dymshits, R. I., 1952
and L. S. Mashkevich
[ON THE MECHANISM OF STIMULATION OF THE CAROTID REFLEXOGENIC AREA IN ANOXIA] K mekhanizmy vozbuzhdeniia karotidnoi refleksogennoi zony pri anoksii. — In: Kislorodnaîa terapiîa i kislorodnaia nedostatochnost', p. 71-76. (Kiev), 1952. In Russian.

After severe hypoxia was induced in dogs by clamping the trachea for 2-6 minutes, increased sensitivity of the carotid sinus to acetylcholine was observed. Stimulation of the cholinergetic processes in the carotid body during anoxia was not noticed. Rinsing of the isolated carotid sinus with Tyrode's or Ringer's solution produced only once an insignificant amount of acetylcholine in the rinsed-off liquid. The authors believe that anoxia does not contribute to the stimulation of the sinus and carotid body by acetylcholine formation, but by other means, e.g., increased concentration of H-ions, due to metabolic disturbances. The inconsistency of these results with those obtained by other authors (who observed a decrease in sensitivity of the carotid sinus to acetylcholine, and stimulation of acetylcholine formation in the sinus during anoxia) are explained by the difference in experimental conditions. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiia (Moskva). 1954 (17): 36-37. DNLM (ZW1.qS729)]

1346

Eckstrand, G. A., 1953
and R. L. Morgan
A STUDY OF VERBAL MEDIATION AS A FACTOR IN TRANSFER OF TRAINING. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-34, Feb. 1953. iii+28 p. (RDO no. 694-44). AD 13 030 PB 109899

Transfer of training between tasks involving physically dissimilar sets of stimuli was investigated by having 62 college students learn a common naming response (color names) to 6 color stimuli and 6 nonsense forms. Motor responses learned to the color stimuli were thereby more readily learned to the forms than when different verbal responses were learned to the two different sets of stimuli. No differences in results occurred when actual colors were substituted for color names. (AD abstract)

1347

Edelberg, R., 1952a
and H. S. Weiss
CENTRIFUGATION OF ANIMALS ABOUT AN AXIS THROUGH THE BODY. — Federation Proceedings, 11 (1^{I}): 40. 1952. DLC (QH301.F37, v. 11)

Dogs, anesthetized with Nembutal and lying on either side, were spun on a horizontal turntable with the heart at the center of rotation. Respiratory rate, EKG, and direct measurement of blood pressure from 4 vessels were recorded simultaneously. The centrifugal force induced by the spin about the heart opposes venous return, resulting, at speeds above 120 r.p.m., in a picture of acute hypoxia. Cardiac output is decreased, as indicated by the marked reduction in arterial pressure, pulse pressure and A-V pressure differences. Tachycardia develops and is primarily attributal to the abrupt, acute fall in carotid pressure. Breathing ceases in the inspiratory phase probably as a result of a caudad displacement of the diaphragm. Animals survived exposures to 200 r.p.m. for 2 minutes but developed subendocardial and cerebral subarachnoid hemorrhages. Similar subendocardial hemorrhages have been produced by the beating of an "empty" heart. The subarachnoid ecchymoses are attributed to the sudden rise in systolic pressure from zero to almost 450 mm. Hg immediately after the run. (From the authors' abstract)

1348

Edelberg, R., 1953
H. S. Weiss, and P. V. Charland
HYDROSTATIC BEHAVIOR OF VASCULAR COLUMN DURING TUMBLING. — Federation Proceedings, 12 (1^{I}): 37. 1953.
DLC (QH301.F37, v. 12)

When dogs were rotated on a spin table, with the center of rotation through the heart, at speeds which either reduced or virtually eliminated cardiac output, peripheral pressures were lower than expected. Subatmospheric pressures at the center of rotation could be an explanation. (From the authors' abstract)

1349

Edelmann, A., 1953
and F. A. Hitchcock
OBSERVATIONS ON DOGS EXPOSED TO AN AMBIENT PRESSURE OF 30 mm Hg. — In: Ohio State Univ., Studies in explosive decompression, p. 42-47. Issued by Wright Air Development

Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953 (RDO no. 696-77). AD 27 765(g) UNCLASSIFIED

Reprint of the paper, Edelmann, A., 1952.

1350

Edelmann, A., 1953a
W. V. Whitehorn, A. Lein, and F. A. Hitchcock
PATHOLOGICAL LESIONS PRODUCED BY EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression ..., p. 32-38. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(e) UNCLASSIFIED

This is the reprint of a paper which appeared in the Jour. Aviation Med., 17 (6): 596-601. 1946. Dogs were explosively decompressed at rates up to 33,650 mm. Hg per second. The following lesions were observed: (1) lung damage varying from petechial to ecchymotic hemorrhages involving all the lobes; (2) cardiac damage, primarily ecchymotic hemorrhages on the mitral valve and subendocardial hemorrhage at the attachment of the mitral valve; (3) ecchymoses under the dura mater and encompassing the sagittal sinus. No hemorrhages were observed in the walls of the gastrointestinal tract, or in the bladder. The sudden increase in intrapulmonary pressure produced by explosive decompression is considered to be the primary etiological agent in the production of these lesions. The presence of these lesions is not associated with any detectable disability on the part of the animal. Functional activity of the central nervous system was not affected. (Authors' summary, modified)

1351

Edgerton, H. A., 1953
R. F. D. Heinemann, and R. S. Barrett
HUMAN ENGINEERING CONSIDERATIONS IN THE DESIGN OF THE INSTRUCTOR'S STATION OF TRAILERIZED OPERATIONAL FLIGHT TRAINERS. — Richardson, Bellows, Henry and Co., New York (Contract Nonr 1042-(00)); issued by Special Devices Center, Port Washington, N. Y. Technical Report no. 1042-00-1, Aug. 15, 1953. iv+47p. AD 116 027 UNCLASSIFIED

Prospective design features of the instructor's station of trailerized operational flight trainers are outlined. The following recommendations are made: (1) the configuration of the instructor's consoles should not be determined by aircraft cockpit displays, but should conform only to the instructor's needs; (2) the switches, controls, instruments, and dials related to one identical activity should be combined; (3) equipment which duplicates information available elsewhere should be eliminated; (4) printed labels should unequivocally convey the proper meaning; (5) the navigation control instruments and the repeater instruments should be housed in separate panels; and (6) the consoles should be designed so that they form a single integrated work unit around a focal point.

1352

Edholm, O. G. 1953
THE MEASUREMENT OF ENERGY EXPENDITURE OF MILITARY CADETS. — Medical Research Council Labs. (Gt. Brit.) Division of Human Physiology, Hampstead; abstracted in: Nickerson, J. L. The Ergonomics Research Society Symposium ... p. 4-5. Office of Naval Research (London). Technical Report no. ONRL-84-53, June 18, 1953. AD 13 520 UNCLASSIFIED

The energy expenditure of 77 cadets at the Royal Military Academy has been estimated, using the Douglas-bag method for determining oxygen consumption for some activities and the energy expenditure rates determined by other workers for the remaining activities. A dietary survey was conducted simultaneously. Every morning for seven days each cadet was issued a diary sheet on which he recorded his activities at half-hour intervals. An analysis was made of the diaries, so that the daily events could be classified under a small number of headings, e. g., lying, sitting, standing, walking, cycling, drill, games, etc. The average daily expenditure equalled 3,420 kilo-calories, as compared with a daily intake of 3,700 kilo-calories. It is likely that the nutritional survey is more accurate than the energy expenditure estimate, which is therefore approximately 10% too low. A high proportion of the total time was spent sitting, which occupied approximately 9 1/2 hours each day. The rest of the day was divided into: sleep, 8 1/2 hours; dressing and cleaning uniform, 2 hours; walking and cycling 1 hour 7 minutes; military training, 46 minutes; games, 46 minutes; miscellaneous, 1 hour 2 minutes. (J. L. Nickerson's abstract, modified)

1353

Edwards, A. S. 1953
THE RELATION OF LIGHT INTENSITY TO ACCURACY OF DEPTH PERCEPTION. — Jour. Applied Psychol., 37 (4): 300-301. 1953. DLC (BF1.J55, v. 37)

In terms of averages alone, it appears that 90 subjects were more accurate in depth perception with greater illumination rather than with less. Analyses of the data, however, show that from one-fifth to one-fourth of the subjects were more accurate with less rather than with more intense illumination. It appeared that no one intensity of illumination was optimal for all subjects. (Author's summary, modified)

1354

Eiband, A. M., 1953
S. H. Simpkinson, and D. O. Black
ACCELERATIONS AND PASSENGER HARNESS LOADS MEASURED IN FULL-SCALE LIGHT-AIRPLANE CRASHES. — National Advisory Committee for Aeronautics, Washington, D. C. Technical Note no. 2991, Aug. 1953. 67 p. AD 15 669 PB 110838

Full-scale light-airplane crashes simulating stall-spin accidents were conducted to determine the decelerations to which occupants are exposed and the resulting harness forces encountered in

this type of accident. Crashes at impact speeds from 42 to 60 miles per hour were studied. The airplanes used were of the familiar steel-tube, fabric-covered, tandem, two-seat type. In crashes up to an impact speed of 60 miles per hour, crumpling of the forward fuselage structure prevented the maximum deceleration at the rear-seat location from exceeding 26 to 33 g. This maximum g value appeared independent of the impact speed. Restraining forces in the seat belt-shoulder harness combination reached 5800 pounds. The rear-seat occupant can survive crashes of the type studied at impact speeds up to 60 miles per hour, if body movement is restrained by an adequate seat belt-shoulder harness combination so as to prevent injurious contact with obstacles normally present in the cabin. Inwardly collapsing cabin structure, however, is a potential hazard in the higher-speed crashes. (Authors' summary)

1355

Elam, J. O., 1953
J. D. Elder, and E. S. Brown
MOUTH-TO-MOUTH ARTIFICIAL VENTILATION. — In: Chem. Corps Med. Labs., Conference on artificial respiration, p. 54-68. Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19, April 1953. AD 9582. PB 109598

Blood gas, air flow, and respired CO_2 data were recorded during actual performance of mouth-to-mouth insufflation in surgical patients during the immediate post-operative period. Two methods, a mouth-to-mask, and a mouth-to-tracheal tube method, were used. The mouth-to-mouth insufflation proved to be the ideal method of artificial ventilation for the following reasons: (1) The patient's alveolar pO_2 can be elevated more quickly than by any other known method; (2) no equipment is necessary; (3) the operator knows immediately whether the patient is being ventilated or not; and (4) sufficient inflating pressure is exerted to deliver an adequate volume, as the operator continuously compensates for changes in airway resistance and in lung compliance. (31 references) (p. 54 and 59)

1356

Elkind, J. I. 1953
TRACKING RESPONSE CHARACTERISTICS OF THE HUMAN OPERATOR. — Sept. 1953. iii+13 p. Massachusetts Inst. of Electronics. Research Lab. of Electronics, Cambridge, Mass. (Contract AF 18(600)-322); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum no. 40. AD 21 657 PB 112728

Mathematical relations are developed for use in determining and expressing the system characteristics of the human operator when he is tracking a randomly moving target. An experimental tracking problem is described, and experimentally determined system characteristics are presented. Effects upon the system characteristics of varying the width of the stimulus power spectrum are also shown. (Author's summary)

1357

Ellingson, H. V. 1953
IMPACT OF MODERN AVIATION ON HEALTH. — Aeronaut. Eng. Rev., 12 (4): 79-81. 1953. DLC (TL501.A326, v. 12)

Modern aviation creates two types of health hazards: (1) those resulting from operation of aircraft (e.g., inhaling of noxious gases, of solvents, or of degreasing agents); and (2) those resulting from travel from areas where communicable diseases and harmful insects may be present. The threat of dissemination of communicable diseases and of spread of harmful insects is increased with the speed of travel, to the point where passengers may be transported and dispersed within the incubation periods of most diseases. It is desirable, for health reasons, to establish an international quarantine program which would control diseases and insects in areas close to international airports, require immunization of travelers, govern insect control aboard aircraft, and obtain information on epidemics through the U. N. World Health Organization. Aviation itself has accelerated international cooperation in disease control by extending geographical coverage of medical centers, and has provided an effective tool in controlling insects by airborne insecticidal sprays.

1358

Elwell, F. S. 1952
EXPERIMENTS TO DETERMINE NEIGHBORHOOD REACTIONS TO LIGHT AIRPLANES WITH AND WITHOUT EXTERNAL NOISE REDUCTION. — National Advisory Committee for Aeronautics, Washington, D. C. Technical Note no. 2728, May 1952. 75 p. TIP U63613 PB 106880

Two light airplanes modified by reduction gears, four-bladed propellers, and engine exhaust silencers were flown in comparison with two standard airplanes at a number of sites of the type that might be useful as "close-in" landing strips within the metropolitan area of Boston, Mass. The objective was to ascertain the neighborhood reactions to the noise of light airplanes flown close to residential properties of varying income levels, population densities, and proximity to trade centers in order to determine whether the degree of noise reduction found to be practicable in the major phases of the research program produced a significant reduction in neighborhood objection to such aircraft operations. The findings indicate that at the ten sites within and about metropolitan Boston the degree of noise reduction previously found to be aerodynamically and structurally feasible did eliminate substantially all neighborhood objections to noise per se. (From the author's summary)

1359

Elwell, K. R. 1953
A PREVENTIVE DENTISTRY PROGRAM. — U. S. Armed Forces Med. Jour., 4 (10): 1463-1467. 1953. DLC (RC970.U7, v. 4)

A preventive dentistry program which complements and supports the oral rehabilitation services

in the prevention and reduction of military dental needs has been established in the Air Force. It is planned to provide a minimum of one annual oral prophylaxis for each military person and to educate and promote the personal interest of airmen in good; daily, oral health practices. Responsibility for developing the program is placed at various organizational levels. Despite an increase in Air Force strength, the oral prophylaxis ratio increased from 1.7 percent in May 1951 to 2.8 percent in May 1952, and to 4.3 percent in May 1953. Reports from air bases indicate that the educational phase of the program is progressing with favorable results. Fluoridation of military water supplies is now under reconsideration. (Author's summary)

1360

Emerson, G. O. 1953

THE EFFECTS OF MONOCULAR BLIND AREAS IN VISIBILITY FROM AIRCRAFT. — Jour. Aviation Med., 24 (6): 518-522. 1953.
DLC (TL555.A1A4, v. 24)

Many areas in the visual fields from aircraft that have been considered to be blind to only one eye, are, in effect, areas that are blind to both eyes. These blind areas are due to opaque structures plus monocular retinal blind areas, or plus suppression of the non-projecting eye. Awareness of the existence of these blind areas should result in more efficient airsearch by making the necessary head movements in addition to head rotations. Knowledge of the existence of these blind areas should cause aircraft designers to attach greater importance to minimizing the number and width of windshield structures, and to make more efficient placements of these structures, in order to provide less obstructed visual fields. (Author's summary)

1361

Eninger, M. U., and J. Weitz 1952

RELATIONSHIPS BETWEEN RHYTHMIC PERFORMANCE AND PSYCHOMOTOR PERFORMANCE. — Carnegie Inst. of Technology, Pittsburgh, Pa. (Contract AF 33(038)-10413); issued by Human Resources Research Center. [Perceptual and Motor Skills Research Lab.]. Lackland Air Force Base, Tex. Research Note no. P&MS 52-1, Jan. 1952. 8 p. (Project no. 509-020-0003). AD 121 410 UNCLASSIFIED

The purpose of this study was to investigate the hypothesis that rhythmic ability is involved in psychomotor task performance. This was done by determining the relationship between simple rythmic performance tests and the performance of subjects on the Rotary Pursuit Test, the Two-Hand Coordination Test, the Self-Pacing Discrimination Reaction Time Test, and the Complex Coordination Test. The following two conditions were employed to measure rhythmic performance: (1) the subjects attempted to synchronize with a visual signal for a one-minute period by depressing a telegraph key in coincidence with the signal; and (2) the same condition as (1) except that an auditory signal was employed. A total of 100 male subjects were tested. Scores were tabulated and correlated. With few exceptions, no significant correlations were found between the two kinds of performances. The conclusion is that rhythmic ability, as operationally defined by the tests used in this study, is not involved in psychomotor task performance.

1362

Erdbrink, W. L. 1953

THE RESERVE AVIATOR. — Jour. Aviation Med., 24 (3): 230-233. 1953
DLC (TL555.A1A4, v. 24)

Same as the paper, Erdbrink, W. L., 1952.

1363

Eriksen, C. W. 1952

LOCATION OF OBJECTS IN A VISUAL DISPLAY AS A FUNCTION OF THE NUMBER OF DIMENSIONS ON WHICH THE OBJECTS DIFFER. — Jour. Exper. Psychol., 44 (1): 56-60. 1952.
DLC (BF1.J6. v. 44)

An experimental method is developed to determine the relation which exists between the ability to discriminate objects on a visual display and the number of visual dimensions (hue, form, brightness, and size) by which these objects are distinguished from each other. A group of 30 test subjects were requested to locate target objects on an illuminated display while setting off an automatic timing device at the moment the display was brought into view. The experiment was divided into two parts. In the first part the speed of location was determined on targets differing in one visual dimension only from the other objects. In the second round of measurements the target objects differed in two or three dimensions. An analysis of the scores revealed that, in the case of single-dimension variance, hue differences were located faster than form differences, and hue and form differences, faster than brightness or size differences. Where a combination of two or three dimensions was displayed, location times corresponded to the weighted geometric mean of the individual dimensions involved.

1364

Eriksen, C. W. 1953

OBJECT LOCATION IN A COMPLEX PERCEPTUAL FIELD. — Jour. Exper. Psychol., 45 (2): 126-132. 1953. DLC (BF1.J6, v. 45)

The present study was concerned with the perceptual variables that determine the speed with which designated objects can be located from among a large field of objects. Two variables, field heterogeneity and target definition, were studied. Field heterogeneity, as determined by the number of ways that the objects in the field differed from one another, was found to be an important determiner of location time. Location was quickest when the fields varied in (1) hue, (2) hue and form, and (3) hue, form, and brightness, and slowest when the field was heterogeneous in hue, form, size, and brightness, and form, brightness, and size. Under comparable field heterogeneity,

target objects that were multiply defined by assigning them unique values on each of several dimensions were located more rapidly than objects defined on only one dimension. (Author's abstract, modified)

1365

Eschenbach, A. E., 1953
and E. F. Borgatta
A REVIEW OF SOME MAJOR RORSCHACH SCORING CATEGORIES AND HYPOTHESIZED PERSONALITY CORRELATES. — Human Resources Research Inst., Maxwell Air Force Base, Ala. Research Memorandum no. 19, Oct. 1953. v+41 p. AD 31 138 PB 117350

Hypothesized and empirically derived relationships between Rorschach scores and personality variables are presented in an effort to facilitate empirical confirmation and research on Rorschach scoring category interpretations. Five major sources of interpretation were chosen on the basis of the richness of hypotheses and the prevalent use of these sources by clinicians as authoritative sources. The number of personality variables found were reduced into a classification system, and the Rorschach scoring category statements and hypothesis presented according to that classification system. The derived classification system is as follows: intelligence (common sense, thinking); adaptability (maturity, age); abstractness (practicalness, imagination, fantasy); self-control; aggressiveness (passivity, hostility, negativism, opposition); emotionality (excitability, irritability, personality instability); inferiority (self-possession, self-esteem, superiority); empathy (social awareness, allocentricity); compulsiveness (perseverance, drive of self, drive to achievement); anxiety (blocking, inhibition); set or attitude of subject; organic conditions (motor performance); manic (depressed and dysphoric conditions); psychotic (neurotic, paranoid, and psychopathic conditions); schizophrenic condition; and sex (sensuality). (AD abstract)

1366

Essen, R. 1953
[NEW RUBBER RAFTS FOR RESCUE AT SEA] Nya gummiflottar för raddning av nödställda till sjoss. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (2): 20-23. 1953. In Swedish. DNLM (W1.SW387, v. 2)

This is a description of a 20-man life raft for use in planes which might be forced down at sea. The craft is made of rubberized canvas and inflated by carbon dioxide, which is carried under pressure in a flask attached to the raft. A tent-like covering, supported by rubber tubes which are also inflated by carbon dioxide at the time the raft is inflated, protects survivors from exposure. The raft takes up little space in its deflated state and weighs 50-75 kg. The carbon dioxide flasks have emergency-operated valves, which open easily and quickly, inflating the raft.

1367

Eugster, J. 1953
METHOD FOR DEMONSTRATING THE BIOLOGICAL EFFECTIVENESS OF COSMIC RADIATION AT HIGH ALTITUDES. — Jour. Aviation Med., 24 (3): 222-226. 1953. DLC (TL555.A1A4, v. 24)

Same as the paper, Eugster, J., 1952.

1368

Euler, C. von, 1952
and U. Söderberg
CHEMORECEPTORS IN THE RESPIRATORY CENTRES [Abstract]. — Jour. Physiol. (London), 117 (3): 30P-31P. 1952.
DLC (QP1.J75, v. 117)

In order to find whether carbon dioxide exerts a stimulating effect on respiration by acting directly on the interneurones of respiratory reflex pathways, or whether it acts on special central chemoreceptors, three different types of experiments were performed on cats. The inspiratory activity in decerebrate and vagotomized cats under tubocurarine and artificial respiration was recorded from one of the roots of the phrenic nerve. The stimulating effect of carbon dioxide was shown to be selectively depressed by chloralose, leaving the stimulating action of several respiratory reflexes (Hering-Breuer, carotid body, laryngeal, and nociceptive) unimpaired. After having completely isolated the rhombencephalon from all nervous connexions, rhythmical as well as continuous discharges could be recorded from the interior of the medulla in response to carbon dioxide added to the inspired gas. In decerebrate cats slow potential changes could be recorded in response to carbon dioxide administration from the regions of the medulla where electrical stimulation is known to evoke inspiration or expiration. However, reflex activation of respiration did not elicit such potential changes. From these experiments we have concluded that the bulbar chemosensitive structures do not form part of the respiratory reflex pathways, but form a special chemoreceptor system. (Complete abstract)

1369

Evans, P. H., 1953
and J. W. Peachy
SPECTACLES IN JET FLYING. — Jour. Aviation Med., 24 (2): 138-139, 164. 1953.
DLC (TL555.A1A4, v. 24)

The attachment of spectacles to helmet has been tried. At best it is a temporary expediency. Principal reasons for failure are the continued fogging of lenses and instability of the P-1 helmets. This provides a dangerous situation for crew and plane and is aggravated by mission requirements, i.e., scrambles. (Authors' summary)

1370

Evans, R. N. 1953
A SUGGESTED USE OF SEQUENTIAL ANALYSIS

IN PERFORMANCE ACCEPTANCE TESTING. — Univ. of Illinois. Coll. of Education, Urbana, [1953]. 31 p. (Contract N6ori-07142). AD 19 058 PB 113952

The advantages, limitations, and means of using sequential analysis in performance acceptance testing are discussed. Sequential sampling appears to be useful in testing whenever (1) testing time per test item is high in relation to the time required to score each test item, (2) the test is primarily designed to determine whether a person passes or fails, (3) there is a need for testing more than about 100 persons on the same test, either in one group or in a number of groups, and (4) there is negligible correlation between items when criterion scores are held constant. Sequential sampling takes item difficulty and item discrimination into account when discrimination score values (norms) are established. Sequential sampling can readily be adapted to changing standards of accepting people, with no revision of the norms previously set up. Ordinarily, sequential sampling will give about the same accuracy as a fixed-length test, with about half of the testing time and about half of the testing cost. (AD abstract)

1371

Evans, R. N., 1953a
and L. J. Smith
A STUDY OF PERFORMANCE MEASURES OF TROUBLESHOOTING ABILITY ON ELECTRONIC EQUIPMENT. — Univ. of Illinois. Coll. of Education, Urbana. Oct. 1, 1953. 39+100 p. (Contract N6ori-07142). AD 23 103 PB 114435

Research was conducted to develop and study suitable performance test measures for use with electronic technicians. The procedure used in constructing and administering a performance test for trouble shooting, the test itself, and data based on the administration of the test are reported. Analysis of the data led to the conclusion that additional use of performance testing in Navy schools for electronics technicians is feasible, particularly if sequential sampling is employed. Performance testing of trouble shooting ability had high face validity. The tab test of trouble shooting ability had almost as high a face validity as performance testing, and a much higher face validity than paper and pencil tests. While laboratory grades correlated most highly with the criterion (performance test scores) of all the variables studied, the correlation (0.40) was somewhat lower than expected. Inter-observer and inter-scorer reliabilities were quite high, on both the tab and performance tests. Interval consistency reliability for both the tab and performance tests was adequate, but moderately low, because of the high rate of learning involved, and the small number of test items used. Evidences of perseveration were found during each administration of tab item and performance tests. (AD abstract)

1372
Evrard, E. 1953
[PREVENTION AND TREATMENT OF AIR SICKNESS BY A NEW ANTIHISTAMINIC: FIRST RESULTS OF EXPERIMENTATION] Prévention et traitement du mal de l'air par un nouvel antihistaminique. Premiers résultats expérimentaux. — Bruxelles-Médical (Bruxelles), 33 (4): 173-184. 1953. In French. DNLM

A new antihistaminic, dichlorhydrate of p-chlorbenzhydryl m-methylbenzyl diethylene diamine (U.C.B. 5062), was administered to a number of subjects susceptive to air sickness, and tested under simulated and flight conditions. The new drug was compared to three antihistaminics whose preventive and therapeutic action toward air sickness had been well established. Five cgm. of the old drugs were used, but only 2.5 cgm. of U.C.B. 5062. Results in 52 subjects (Belgian Navy personnel) showed that the duration of depressive action of U.C.B. 5062 upon the labyrinth was over 9 hours for very violent stimulations, over 12 hours for moderate, and up to 24 hours for weaker stimulations, instead of 4-10 hours, as in the case of the other three drugs. However, its effects manifested themselves only 30-45 minutes after ingestion (instead of 15-20 minutes in the other drugs). The aforementioned dose had none of the secondary psychic effects of the other antihistaminics. The drug was administered consecutively over a number of flight days in stormy weather and prior to repeated practice flights, which included numerous acrobatic maneuvers, without even one occurrence of air sickness or side effects. The effectiveness of U.C.B. 5062 is therefore very powerful. The use of this drug may permit retention in service of those student pilots who, having already acquired some flight experience, become airsick during acrobatic maneuvers, but not on normal flights.

1373
Evrard, E. 1953a
[MEDICAL AND PHYSIOLOGICAL ASPECTS OF SUPERSONIC AND HIGH-ALTITUDE FLIGHT] Aspects medico-physiologiques du vol supersonique et du vol à très haute altitude. — Bruxelles-Médical (Bruxelles), 33 (35): 1765-1782. 1953. In French. DNLM

A survey of special aspects of the chief physiological factors during supersonic and high-altitude flights is presented. The article deals with the following subjects: (1) vision: at supersonic speed human vision has to be supplemented by a radar screen; (2) the time-distance problem in flight: the period of latency of visual perception, which induces a time lag of 0.10 second, acquires very great importance in supersonic speed (automatically directed planes are therefore envisaged for the future); (3) the elevation in the cabin temperature at supersonic speed; (4) the maintenance of pressure in the cabin; (5) acceleration; (6) noise and vibrations; (7) radiations; (8) collisions with meteorites; (9) sensations of weightlessness; (10) parachute bailouts and safety measures; and (11) fatigue resulting from new types of psychological stress.

1374

Evrard, E. 1953b

[INSTRUCTION OF PILOTS IN THE BAROCHAMBER ON THE PHYSIOLOGICAL ASPECTS OF FLIGHT] L'instruction des pilotes en caisson pneumatique sur les aspects physiologiques du vol. — Bulletin international des services de santé des armées de terre, de mer et de l'air (Liège), 26 (5): 174-183. In French. DNLM

A brief description is presented of the barochamber used for training of flight personnel of the Belgian Air Force and for aeromedical research. The barochamber comprises one large, central compartment and two small compartments. The central compartment seats 12 students and 3 instructors. The first compartment serves as an entrance hall, and the third compartment is especially designed for explosive decompression exercises. The decompression mechanism of the barochamber permits simulation of all forms and rates of decompression that may occur under actual flying conditions. It is devised in such a manner that, though the attainable decompression speeds are high, the safety of the 4 occupants of the compartments is never endangered. Decompression experiments with animals are conducted at simulated altitudes of 20, 000-25, 000 m. The temperature in the barochamber may be reduced to -68°C. and raised progressively to 55°C. Flight physiology is taught in both the elementary (12 hours), and the advanced pilot course (18 hours), followed by a full day of practical instruction, which includes lessons on altitude and oxygen equipment, on explosive decompression, on acceleration and speed effects, on intense cold, and on methods of survival.

1375

Evrard, E 1953c

[MEDICAL COMMENTARY ON FATIGUE IN FIGHTER PILOTS] Commentaire médical sur la fatigue du pilote de chasse. — Médecine aeronautique, 8 (4): 332-333. 1953. In French. DLC (TL555.M394, v. 8)

Fatigue in fighter pilots is mostly conditioned by mental factors combined with emotive components. Physical and nervous factors (fatigue or synapses) are of secondary nature only, and are easily remedied by sleep. Flight surgeons are primarily preoccupied by mental fatigue as experienced in fighter pilots. In placing the emotive stress in the frame work of Selye's General Adaptation Syndrome, the mechanism and symptomatology of this condition can be easily explained. The continuous and repeated excitation of the hypothalamus is responsible for the origin of mental fatigue. From the point of view of development of symptomatology, the syndrome of fatigue in fighter pilots displays three periods as observed in the General Adaptation Syndrome: (1) period of alarm (symptoms: hypotension, tachycardia, nervous depression, hypoglycemia); (2) period of resistance (symptoms: increase in glycemia and chlorosis); and (3) period of exhaustion (symptoms: decrease of glucose, of chlorides, and of the blood pressure).

1376

Evrard, E., R. Moorthamers, V. Verhamme, and H. Chardon 1953d

[ACCIDENTS CAUSED BY SUCTION OF HUMAN BEINGS BY TURBOJET] Accidents d'aspiration de sujets humains par turbo-réactuers d avions. — Médecine aéronautique (Paris), 8 (4): 343-357. 1953. In French. DLC (TL555.M394, v. 8)

Fifteen cases of fatal and non-fatal accidents involving the technical personnel of turbojet fighter planes are discussed. A detailed analysis of these cases led to the following conclusions: (1) no death occurred when the subject situated near the scoop was exposed to air suction for 20 seconds; and (2) fatalities connected with accidents were due to traumata occurring when the body was smashed against the opening of the scoop, or the body was lifted, or the head was sucked in first. Of the eight fatal cases, death occurred immediately in three accidents. The speed of rotation of the turbine, the weight and shape of the body, and its distance from the orifice of the scoop, all have a marked effect on the harm done by the suction current. Among the subjects who survived the accident, no sequelae were experienced in seven cases. Loss of consciousness and slight shock were the most common symptoms. No grave respiratory or circulatory disorders were observed. The following preventive measures are recommended: (1) a circle should be painted around the jet to call attention to the danger zone; (2) uniforms should be buttoned to reduce the danger of suction; and (3) a grill should be placed on the air chamber of the turbine before testings on the ground.

1377

Evrard, E. 1953e

[MEDICO-AERONAUTICAL INDOCTRINATION OF THE FLYING PERSONNEL IN THE BELGIAN AIR FORCE] L'indoctrination médico—aéronautique du personnel navigant a la Force Aérienne Belge. — Revista portuguesa de medicina militar (Lisboa), 1 (2): 257-261. 1953. In Portuguese. DNLM

The instruction of flying personnel of the Belgian Air Force in aviation medicine is aimed at adapting the trainees to various tasks requiring special physical stamina. Instead of creating a special training school, courses, both theoretical and practical, are conducted by air force surgeons at the air bases. During the first six months of training, such subjects as anatomy, physiology, and first aid to victims of accidents are covered. During the advanced training period, instruction, both theoretical and practical, is given on the following subjects: effects of altitude and acceleration, pathophysiological effects of parachuting, use of the oxygen mask, air sickness, visibility during night flight, effects of vibration and radiation, nutritional and toxicological aspects, and survival. The regular pilot course, which lasts fifteen months in the Belgian Air Force, is further advanced by informal lectures and conferences at the air bases.

1378

Falconnet, P., and P. Robert 1953

[CRITICAL EVALUATION OF THE OTOLOGICAL APTITUDE OF AVIATORS IN VARIOUS AVIATION JOBS] Étude critique des conditions d'aptitude otologique aux différents emplois du Personnel navigant de l'Aviation. — Médecine aéronautique (Paris), 8 (1): 47-49. 1953. In French. DLC (TL555. M394, v. 8)

Modifications of the hearing standards in use in the French Air Force are discussed. Since flying activity may be followed by partial deafness at a later age, it would be practical to accept only candidates with perfect hearing. This means a correct perception of frequencies within and even beyond the range of speech in audiometric tests. However, an auditory deficiency of 20 decibels at frequencies of 200, 250, 1,000, 3,000 or 4,000 c.p.s. should not be a cause for rejection. It is also advisable to test the perception of higher frequencies such as 8,000 c.p.s., as in certain cases auditory trauma can be detected in young men only above 4,000 c.p.s. Mechanics should be tested only in the frequency-ranges of 250, 500, 1000, and 2,000 c.p.s. because they often acquire a certain degree of deafness during their training period. With regard to safety, different consideration should be given to the otological requirements of experienced aviators. They may be divided into two groups: (1) personnel using the radio-telephone (pilot, radio-navigator) and (2) aviators engaged in direct conversation only (navigator and mechanic). Test condition suggested for group one: radiotelephonic messages of an intensity of 108 db. should be transmitted at an environmental noise level of 100 db. For the second group of aviators it is suggested that the criterion of hearing be the spoken word from a distance of 75 cm. in the cockpit at an environmental noise of 100 db.

1379

Falconnet, P., and H. Maries 1953a

[DEVELOPMENT OF COCHLEAR DEAFNESS IN AVIATORS] Modes évolutifs de la surdité cochléaire des aviateurs. — Médecine aéronautique (Paris), 8 (1): 50-55. 1953. In French. DLC (TL555.M394, v. 8)

The usual audiogram in cochlear deafness in aviators caused by noise is characterized by the complete perception of deep sounds up to the frequencies of 1000 and 2000 c.p.s., and by a marked decrease in the audibility of high sounds which in extreme cases may indicate a hearing loss of 80-90 decibels at frequencies above 2000 c.p.s. The audiographic curves may be of two shapes: one curve is of a jerky shape showing damage to the entire auditory field with a marked impairment of the perception of high sounds; the bone conduction curve displays a similar form. In the second type of hearing deficiency, the audiogram is V-shaped, showing good perception of high as well as low tones (10,000 to 12,000 c.p.s., and 100-400 c.p.s.) and loss at intermediate frequencies; the bone conduction audiogram is in general analogous, but shows a hyperacuity in the range of low sounds, where the aerial audiogram is perfectly normal. — Usually both ears are affected, both qualitatively and quantitatively. In certain cases, however, one ear is more affected (usually it is the left ear) due to the position of the aviator in the plane.

1380

Falconnet, P., F. Langraf-Favre, and J. Bastien 1953b

[ON THE VARIOUS METHODS OF MEASURING THE EFFICIENCY OF EAR PROTECTORS] Quelques réflexions sur les diverses méthodes de mesure de l'éfficacité des protecteurs auriculaires. — Médecine aéronautique (Paris), 8 (1): 56-60. 1953. In French. DLC (TL555.M394, v. 8)

Ear protectors should not only prevent occupational deafness in aviators but also eliminate the effects of harmful noises without significantly reducing the intensity of frequencies of the spoken language. Ear protectors are of two kinds: extraauricular [ear muffs] and intraauricular [ear plugs]. Four subjects were provided with ear plugs (a cylindrical rubber device inserted in the auditory duct and open toward the ear drum) and were tested in silence within the frequency range of 200 to 15,000 c.p.s. A certain filtering action of the ear protector was seen at various frequencies. Then hearing in the presence of simulated airplane noise (frequency range, 100-10,000 c.p.s.) was evaluated with and without ear protector. Both audiograms showed a great impairment of hearing and this impairment was more marked when the ear protector was used. — Another type of ear plug consisted of a perforated tube of hard rubber covered with a layer of soft rubber. The subject was placed at a distance of 2 1/2 m. from the nozzle of a Vampire jet plane turning his left ear (provided with an ear plug) toward the source of the noise. The left ear, in contrast to the right one, remained entirely free of symptoms of deafness or tinnitus.

1381

Falconnet, P., A. Noger, and C. Robert 1953c

[LATE SEQUELAE OF ACUTE BAROTRAUMA OF THE MIDDLE EAR] Les séquelles tardives des barotraumatismes aigus de l'oreille moyenne. — Medecine aeronautique (Paris), 8 (1): 63-65. 1953. In French. DLC (TL555.M394, v. 8)

During ascent in an airplane, the Eustachian tube of a healthy person opens to balance the pressure difference between the middle ear and the surrounding atmosphere. During descent the pressure in the middle ear may be equalized by swallowing, yawning, chewing, performing the Valsalva maneuver, etc. These maneuvers cause the tympanic membrane to distend and retract alternatingly. "True" aerotitis media is characterized by marked congestion, edema, hemorrhage, and lacerations of the mucosa of the middle ear. The following sequelae

may be observed in aviators: (1) the majority of aerotitis media cases recover completely; (2) after several thousand flight hours, certain anatomical modifications (thickening, opacity, calcified areas in the tympanic membrane) may develop which are purely of an anatomical and not of a functional nature; (3) among 960 aviators examined, deafness due to chronic aerotitis media alone was observed in only one case; and, (4) chronic deafness due to various causes combined with acute aerotitis media is observed more frequently. It is hard to evaluate the role of acute aerotitis media in this type of deafness.

1382

Falk, A. 1953
[A CATAPULT SEAT FOR EJECTION TRAINING FROM A J-29] Katapultstol för träning av uthopp ur FPL J 29. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (3): 15-17. 1953. In Swedish. DNLM (W1.SW387, v. 2)

Using a damaged J-29 fighter plane, a laboratory setup was devised to train pilots in the use of the catapult seat for ejection from fighter planes. The damaged plane was permanently fixed in position in a hangar, and an ejection seat with guide rails leading backward and up was installed in the cockpit. When the student pilot sitting in the cockpit pulled down the protective wind curtain mounted above him on the seat assembly, the seat release mechanism was triggered, two heavy weights attached by cables to the back of the seat dropped on pulleys, and the seat rose up and out of the cockpit with a force of 5-6 g until it was braked at the top of the inclined rails.

1383

Falk, V. S. 1953
A MARINE DIVE BOMBER SQUADRON AT GUADALCANAL, 1942. — Jour. Aviation Med., 24 (3): 237-239, 248. 1953.
DLC (TL555.A1A4, v. 24)

This is the actual report of the Marine Scout Bombing Squadron 141 at Guadalcanal in 1942. The author was squadron flight surgeon for a period of six weeks during the Guadalcanal campaign. Forty one pilots and three hundred men made up the original compliment; of the pilots, total casualties amounted to twenty-nine in six weeks. Enlisted casualties for the same period were nineteen. The author indicates that inadequate training in the operation of their special aircraft plus the extremely severe battle conditions encountered on Guadalcanal were responsible for such a high casualty rate among the pilots.

1384

Fang, H. S., 1953
A. L. Hall, and T. F. Hwang
THE INFLUENCE OF PROLONGED STAY IN THE DARK ON FOVEAL DARK ADAPTABILITY. — Naval School of Aviation Medicine, Pensacola, Fla. Oct. 12, 1953. 5 p. (Project Report no. NM 001 059.30.01). AD 27 393 UNCLASSIFIED

Two male subjects trained in the operation of the Nagel adaptometer were individually exposed to a 200-lux white light for 5 minutes. The subjects were then exposed in the dark and tested for foveal dark adaptability. The test field subtending a visual angle of 1° was circular, and a 765-millimicron red filter was placed over the test field. A small star of red light used as a fixation point was placed just within the upper margin of the test field. The threshold of relative-stimulation intensity decreased very rapidly within the first 1 to 2 minutes of dark adaptation, and the foveal dark adaptation became constant from 2 or 3 to 90 minutes later. After 3 hours in the dark, the dark adaptation of the cone portion showed slight improvement with little lowering of threshold. The foveal dark adaptation increased 100% after 5-7 hours, and the maximum improvement in cone adaptation appeared between 8 and 10 hours. (AD abstract)

1385

Fang, H. S., 1953a
A. L. Hall, and T. F. Hwang
EFFECTS OF CARCHOLIN ON DARK ADAPTATION AND VISUAL PURPLE REGENERATION. — Naval School of Aviation Medicine, Pensacola, Fla. Dec. 10, 1953. 7 p. (Project Report no. NM 001 059.30.02). AD 27 390 UNCLASSIFIED

A measurement of dark adaptation in man was done with the use of Nagel's adaptometer and an estimation of the visual-purple concentration of toads was performed by a simple comparison of the retinal colors with Garten's table and a precise determination with an electric spectrophotometer. 0.6-1.0 mg. of Carcholin intake produced an improved effect on dark adaptability with corresponding lowering of threshold in man. The duration and strength of such an improvement varied in degree according to the dosages used. Some side effects such as slight increase of salivary secretion and belching of gas were noticed after Carcholin intake. 1.0 cc. of 0.001% Carcholin injection (into breast lymph) accelerated the regeneration of visual purple in toad. The relationship between the speed of visual purple regeneration and the dark adaptability is discussed. (Authors' summary)

1386

Fang, H. S., 1953b
D. W. Northup, and E. J. Van Liere
COMBINED EFFECT OF TETRAETHYLAMMONIUM CHLORIDE AND HYPOXIA ON INTESTINAL MOTILITY IN RATS. — Amer. Jour. Physiol., 173 (3): 459-460. 1953.
DLC (QP1.A5, v. 173)

Using Macht's technique of measuring the distance traversed by charcoal through the small intestine, the effect of tetraethylammonium chloride (TEA) at two dosage levels, of hypoxia at two levels, and of the two agents combined on the propulsive motility of the gut was studied in the rat. Twenty mg./kg. of TEA was as effective as 40 mg./kg. in depressing motility. Reasons are given for concluding that TEA blocks the autonomic ganglia of the small intestine. TEA and hypoxia

together depressed motility more than either agent alone. It is concluded that hypoxia has effects on the gut other than those on its extrinsic nerve supply, since it depressed motility after TEA had blocked the autonomic ganglia. (Authors' summary)

1387

Farnsworth, D., 1953
and B. Hillmann
A COMPARISON OF SPECIFICATIONS FOR DARK ADAPTATION RED. — Naval Medical Research Lab., New London, Conn. Report no. 219 (vol. 12, no. 4), Feb. 2, 1953. v+18 p. (Project report no. NM 002 014.01.01). AD 20 956
UNCLASSIFIED

The current specifications for red goggles, red compartment lighting fixtures, and red panel illumination for dark adaptation purposes are discussed and evaluated. A specification which computes rod and cone stimulation factors is found to be most effective in obtaining only those reds which allow the speediest subsequent dark adaptation. Common standards for measuring the spectral quality of the filter materials are recommended, and a computation form is proposed which incorporates rod and cone stimulation factor limits based on the most recent luminosity-energy data. (Authors' abstract)

1388

Fasola, A. F., 1952
R. C. Baker, and F. A. Hitchcock
STUDIES ON DECELERATION [Abstract]. — Amer. Jour. Physiol., 171 (3): 723. 1952.
DLC (QP1.A5, v. 171)

A study of the tolerance of the human pectoral girdle to rapid deceleration was undertaken to determine a more suitable and less vulnerable part of the body for the attachment of safety harnesses, since evidence previously reported showed the placing of these harnesses in the abdominal region produced both morphological and physiological damage. Static and dynamic tests were conducted to determine the strength of the following structural components of the axillary region: coracoid, acromion, and coraco-acromial ligament. Tests were likewise conducted on the shoulder joint denuded of muscles with and without the accessory socket intact and in the cadaver. Four methods were used to determine the magnitude of the force necessary to cause damage to these structures: (1) direct reading of calibrated spring balance, (2) static loading, (3) mathematical determination from coefficient of elasticity of system, (4) electronic recording with Ramburg Accelerometer. Samples were taken from normal human cadavers and tested in the fresh state. An over-all average of samples and methods shows the coracoid vulnerable to a force of 175 pounds, acromion 170 pounds, and coraco-acromial ligament 150 pounds. A force of 150 pounds caused rupture of the shoulder joint capsule minus the accessory socket, and a force of 300 pounds caused damage with the accessory socket intact. 2300 pounds at each axilla caused damage in the cadaver when this force acted for 0.08 seconds. Fractures produced were similar in both the isolated and intact state. (Complete abstract)

1389

Faucett, R. E. 1953
THE EFFECT OF DRAMAMINE ON VISUAL AND AUDITORY ACUITY. — Naval Medical Research Lab., New London, Conn. Report no. 222 (vol 12, no. 6), April 3, 1953. iv+13 p. (Project Report no. NM 002 015.09.01). AD 20 957 UNCLASSIFIED

Tests were made on each of 58 subjects after administering Dramamine or a placebo, and without drug or placebo. The subjects were male naval personnel, 18-30 years old; 12 were tested for visual acuity, 22 for auditory acuity, and 24 for color perception. A standard Biophotometer was used in measuring the visual acuity; a 6-octave audiogram on one ear only was used for auditory acuity; a double-wedge hand anomaloscope measured the color perception; a Bausch and Lomb Stereoscopic Trainer (M2) was employed for stereoscopic acuity; a Krasno-Ivy Flicker meter provided flicker-threshold data. Dramamine in 100-mg. doses had no effect on the visual and auditory senses. (AD abstract)

1390

Fehr, R. O., 1952
R. J. Wells, and T. L. Bray
ACOUSTIC DESIGN OF AIRCRAFT GAS TURBINE TEST CELLS. — Jour. Acoust. Soc. America, 24 (5): 480-489. 1952.
DLC (QC221.A4, v. 24)

This paper reports work done by the Aircraft Gas Turbine Division of the General Electric Company at their plants in Lockland, Ohio, and in Lynn, Massachusetts. Permissible sound levels were established for surrounding residential areas. The attenuation due to spherical divergence, and also the probable deviation due to varying atmospheric conditions, was determined. Thus, the sound level permissible at the exhaust stacks of the test cells was obtained. Knowing the noise level inside the test cell, the required sound attenuation of the stacks was calculated. Various acoustical treatments were investigated. An acoustical design is proposed which makes use of a combination on various duct treatments and which meets the established design objectives. The permissible noise level inside the control room is discussed, and the required attenuation through the barrier between test cell and control room is calculated. A design for a control room meeting the established noise-level criterion is proposed. (Authors' summary)

1391

Fehr, R. O. 1952a
UNSOLVED PROBLEMS IN THE FIELD OF AIRCRAFT NOISE. — Jour. Acoust. Soc. America, 24 (6): 772-775. 1952.
DLC (QC221.A4, v. 24)

Noise-control problems in connection with turbo-jet engine testing as well as operation are summarized as experienced by the engine manufac-

turer, the airframe manufacturer, and the operators of aircraft and of airports. Some of these noise-control problems can be solved by isolation of the noise source, others require reduction of the noise at the source. The important still unsolved problems are stated, together with background information, which may be useful to know when attempting their solution. (Author's summary, modified)

1392

Ferguson, F. P., 1953
Dietrich C. Smith, Frances C. Brown, and C. F. Hendrickson
EFFECTS OF ACUTE DECOMPRESSION STRESS UPON PLASMA ELECTROLYTES AND RENAL FUNCTION IN DOGS. — Amer. Jour. Physiol., 173 (3): 503-510. 1953. DLC (QP1.A5, v. 173)

The effects of hypoxia, produced by decompression to a simulated altitude of 30,000 feet for 90 minutes, have been studied upon unanesthetized dogs. One consistent result of decompression was a marked decrease (average about 19%) in plasma-potassium concentration. The decrease occurred within the first 30 minutes of decompression and persisted throughout the remainder of the exposure. Plasma-sodium concentration remained unchanged. Hematocrit values increased during the first 30 minutes of decompression, and remained elevated throughout the rest of the exposure. The significance of this effect is heightened by the fact that, in the controls, hematocrit values decreased progressively with blood sampling. The general trend of the eosinophil count during decompression, although not marked, was downward. A significant decrease was observed, however, in samples taken 90 minutes after the animals were returned to atmospheric pressure. In the kidney, glomerular filtration rate showed no significant change during decompression. Urine flow decreased markedly in most experiments, however, indicating an increased tubular reabsorption of water. The effects of decompression upon sodium excretion were not consistent. (From the authors' summary)

1393

Ferraris de Gaspare, P. F. 1952
[ON THE BEHAVIOR OF GOLDMANN'S ARTIFICIAL SCOTOMA AND OF THE ANGIOSCOTOMA UNDER VARIOUS EXPERIMENTAL CONDITIONS] Sul comportamento dello scotoma artificiale di Goldmann e degli angioscotomi in varie condizioni sperimentali. — Bolletino d'oculistica (Bologna), 31 (3): 157-174. 1952. In Italian, with English summary (p. 173-174). DNLM

The variations of Goldmann's artificial scotoma and of an angioscotoma were studied during the breathing (1) of pure oxygen at atmospheric pressure, (2) of an oxygen-poor mixture (11 or 7% O_2), (3) of air containing 2 or 5% CO_2, (4) after intravenous injection of nicotine, (5) after the injection of adrenalin, and (6) after the inhalation of amyl nitrites. Results showed that artificial scotoma and angioscotoma variations did not always run parallel, the artificial scotoma response being more uniform and more pronounced. During breathing of 7% oxygen, there was an enlargement of the angioscotoma in at least 16 out of 20 cases; of the artificial scotoma, in 19 out of 20 cases. Goldmann's artificial scotoma response depends exclusively on the functional stage of the visual neurons, while the angioscotoma response depends on the functional state and caliber of the retinal vessels and on the resulting mechanical and trophic consequences. Therefore, Goldmanns' slit device provides a more exact method of determining the functional state than the study of angioscotomas.

1394

Fink, R., 1953
and G. Gray
EFFECTS OF FOUR ORIENTATION PROCEDURES ON AIRBORNE TRAINEES. — George Washington Univ., Human Resources Research Office, Washington, D. C. Research Memorandum no. 1, Oct. 1953. viii+32 p. AD 19 191.
UNCLASSIFIED

A total of 909 men in 4 air-borne training companies were randomly divided into 4 groups, each of which was subjected to a different type of pre-training orientation. The 4 procedures were: (1) standard orientation, normally used in the training of air-borne students; (2) non-fear orientation, similar to the standard orientation except for the deletion of reference to fear, safety, or washout; (3) no orientation; and (4) glory orientation which stressed the history, tradition, and esprit de corps of the air-borne and avoided references to fear, safety, or washout. The results indicate that no important differences in performance or attitudes occurred among the air-borne trainees as a result of varying the training orientations. The relatively small amount of time devoted to the orientations was regarded as the reason for the general absence of differential effects from the various procedures which were tried. (AD abstract)

1395

Fitts, P. M., 1952b
and C. W. Simon
SOME RELATIONS BETWEEN STIMULUS PATTERNS AND PERFORMANCE IN A CONTINUOUS DUAL-PURSUIT TASK. — Jour. Exper. Psychol., 43 (6): 428-436. 1952. DLC (BF1.J6, v. 43)

Essentially the same as the paper, Fitts, P. M., 1952a.

1396

Fitts, P. M., 1953
E. Marlowe, and M. E. Noble
THE INTERRELATIONS OF TASK VARIABLES IN CONTINUOUS PURSUIT TASKS: I. VISUAL-DISPLAY SCALE, ARM-CONTROL SCALE, AND TARGET FREQUENCY IN PURSUIT TRACKING. — Ohio State Univ., Columbus (Contract AF 33(038)-10528); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-34, Sept. 1953. v+66 p. (Project no. 509-020-0004). AD 25 854
UNCLASSIFIED

The interrelations of visual-display scale, arm-control scale, and frequency of target motion in a continuous pursuit task were studied using a simple harmonic target motion presented in one dimension on a cathode-ray tube by an electronic apparatus. Both quantitative and qualitative data were characterized by large individual differences among subjects in addition to differences systematically related to the three task variables. Relative performance improved significantly as either the display scale or the control scale was increased for scores expressed as a ratio of error magnitude to display-scale magnitude. Examination of graphic data indicated that at the higher frequencies greater difficulty is encountered in matching the phase of target motion. Acceleration patterns showed a decrease in peak amplitude and a decrease in variability of acceleration as a function of practice. Individual learning curves indicated more improvement in the error RMS and the 15% time-on-target scores than in the other two criteria. (From AD abstract)

1397

Fitts, P. M., 1953a
and C. M. Seeger
S-R COMPATIBILITY: SPATIAL CHARACTERISTICS OF STIMULUS AND RESPONSE CODES. — Jour. Exper. Psychol., 46 (3): 199-210. 1953.
DLC (BF1.J6, v. 46)

Experiment I was planned to test the hypothesis that information transfer in a perceptual-motor task is in large measure a function of the matching of sets of stimuli and sets of responses. Nine S-R ensembles, involving variations of the spatial patterns of stimuli and responses, were studied in an eight-choice situation, using groups of 72 matched subjects. The results, analyzed in terms of reaction time, errors, and information lost, support the hypothesis. They indicate that it is not permissible to conclude that any particular set of stimuli, or set of responses, will provide a high rate of information transfer; it is the ensemble of S-R combinations that must be considered. Experiment II was planned to test the permanence of three selected S-R compatibility effects. Five subjects were trained for 32 days to make a particular set of responses to each of three sets of stimuli. Differences in reaction time, movement time, and frequency of errors in responding to the three sets of stimuli persisted over the 32 days. It appears that it is very difficult for subjects to learn to deal effectively with the information (uncertainties) characteristic of a specific situation, if these uncertainties are different from the more general set of probabilities which have been learned in similar life situations. (Authors' abstract, modified)

1398

Fitzpatrick, R., 1953
J. N. Vasilas, and R. O. Peterson
PERSONNEL AND TRAINING FACTORS IN FIGHTER AIRCRAFT ACCIDENTS. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-13260); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memo. Report no. 37, April 1953. vii+36 p. AD 14 933 PB 113183

An attempt was made to determine the possibility of predicting the accident proneness of pilots. Data were taken from test scores of classification batteries and personal histories of pilots. A large, relatively homogeneous sample of pilots was subdivided into groups still more homogeneous. Determinations were made of the relationships between accidents and scores on the following tests: arithmetic reasoning, biographical data, two-hand coordination, finger dexterity, dial and table reading, speed of identification, and discrimination reaction time. Only a slight relationship was observed between aircraft accidents and a pilot's test scores. The intergroup inconsistencies prevented justification of any over-all generalizations. (AD abstract)

1399

Fitzpatrick, R., 1953a
and J. N. Vasilas
NEAR-ACCIDENT REPORTS IN AVIATION: THEIR COLLECTION AND ANALYSIS [Abstract]. — Amer. Psychologist, 8 (8): 350. 1953.
DLC (BF1.A55, v. 8)

Methods for collecting and analyzing reports of near-accidents and "close calls" were investigated to supplement accident prevention and research. A total of 1,778 anonymous reports submitted by pilots of various Air Force bases were examined. Two proposed methods of collecting reports were tried out. The group-orientation method (in which the local Flight-Safety Officer called in groups of pilots periodically to write reports) yielded greater numbers of reports than the other experimental method. Both methods elicited more reports than have been collected by previous methods. The kinds of reports collected by the new methods appear to be more usable for detection of unsafe acts than are reports obtained by previous methods. Finer breakdowns of reports spotlighted certain errors and malfunctions which appear to be specific to, and diagnostic for, certain aircraft and situations. (Authors' abstract, condensed)

1400

Flacke, W., 1953
and G. Mulke
[ON THE EFFECTS OF DRUGS AT LOW ATMOSPHERIC PRESSURE] Zur Wirkung von Pharmaka im Unterdruck. — Archiv für experimentelle Pathologie und Pharmakologie (Leipzig), 218 (1-2): 95-97. 1953. In German. DNLM

Mice were placed at 180 mm. Hg atmospheric pressure for 6 minutes after treatment with the following drugs: cardiazol, pyramidon, diphenylhydantoin, chlorophyll, ethyl alcohol, and gynergen. An indirect relationship was established between survival time and low body temperatures. Prevention of temperature drop (by warming of the body or by administering small doses of veronal)

removed the prophylactic effect to hypoxia. Coramin, which at larger doses induces first an increase then a decrease of temperature, increased tolerance to hypoxia only in the low temperature phase. The relationship between prolonged hypoxia tolerance and lowered body temperature was most conspicuous when a combination of chlorophyll and veronal was administered, which augmented the temperature drop. The stronger effect of ethyl alcohol as compared to barbiturates (luminal) was found to be due to a greater temperature decrease induced by the alcohol. However, observations with ethyl alcohol and pyramidon have shown that there is an optimum protective effect, which should not be overstepped.

1401

Fleishman, E. A., and B. Reynolds 1952

COMPARATIVE DATA ON THE STANDARD RUDDER CONTROL TEST AND THE EXPERIMENTAL SIX-TARGET RUDDER CONTROL TEST. — Human Resources Research Center. [Perceptual and Motor Skills Research Lab.], Lackland Air Force Base, Tex. Research Note no. P&MS 52-4, Feb. 1952. 10+1 p. (Project no. 509-020-0003). AD 115 441 UNCLASSIFIED

The purpose of this note is to compare the reliabilities and intertrial correlations of the Standard Rudder Control Test, CM120C (Standard Model) and the Experimental Six-Target Rudder Control Test (Experimental Model) and to present the correlations between the two tests. The tests were administered to 210 Air Force Pilot-Cadets. The analysis revealed that, relative to the Standard Rudder Control Test, number-of-targets score on the Experimental Six-Target Rudder Control Test yields (1) a more reliable split-half score, (2) more consistent performance on successive trials, and (3) equal and high predictability from any trial to total performance. Although intercorrelations between the scores of the two test models yielded inconclusive evidence, nothing is indicated which suggests the Six-Target Rudder Control Model may not be substituted for the Standard Model. Further evidence is needed, however. (Authors' introduction and summary)

1402

Fleishman, E. A. 1953

THE PERCEPTION OF BODY POSITION: EFFECT OF SPEED, MAGNITUDE AND DIRECTION OF DISPLACEMENT ON ACCURACY OF ADJUSTMENT TO AN UPRIGHT POSITION. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-1, Jan. 1953. v+17 p. (Project no. 509-020-0003). AD 14 729 PB 110665

This study investigated the influence of certain factors on accuracy of adjustment to an upright position in the absence of a visual frame of reference. Ninety subjects were subjected to displacements of 15°, 20°, and 25° in a lateral plane, and displacement speeds of 4°, 5°, and 6° per second in a tilting chair arrangement. The major findings of the study were as follows: There is a greater average error in adjusting to an upright position as magnitude of initial displacement increases and speed of displacement decreases. The constant error of adjustment is generally in the direction of initial displacement. There is an increasing constant error in the direction of initial displacement as magnitude of displacement increases. Precision of adjustment is influenced by the direction of displacement. When the subject is required to adjust from the right in two successive trials, greater average error results. The introduction of two more difficult trials ("right" displacements) in a row at an early state of practice seems more detrimental to over-all performance than the introduction of such trials at later stages. Individual subjects show a high degree of consistency in performance at various stages of practice in precision of adjustment to the upright. The findings are related to previous work and questions raised by the present study are discussed. (From the author's summary)

1403

Fleishman, E. A. 1953a

AN EVALUATION OF TWO PSYCHOMOTOR TESTS FOR THE PREDICTION OF SUCCESS IN PRIMARY FLYING TRAINING. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-9, May 1953. iv+20 p. (Project no. 509-020-0003). AD 14 466 PB 110651

The six-target Rudder Control Test (RCT) is a self-pacing test in which the subject shifts rudder foot pedals to maintain cockpit seat balance and position in response to as many successively presented targets as possible. The score is the number of targets achieved. In the standard RCT, which is not self-pacing, the score is the total time the apparatus is held on the targets. In the Dynamic Balance Test (DBT) the subject maintains a 0.5-second balance of a teeter-totter board on which he is standing in response to a target. Successive targets require different positions of the board. In comparison to the standard RCT, the 6-target RCT was more reliable, more stable from trial to trial, and less complex factorially; lower correlations were obtained with other aircrew tests, but the test was less valid (0.33) than the standard RCT (0.38). An analysis of the total matchings achieved and the total time required revealed that DBT had an adequate reliability and a low communality with other tests, but lacked high intertrial correlation and had a low validity for predicting pilot success. The substitution of the 6-target RCT for the standard RCT was recommended to determine the effect of the substitution on the composite validity of the Aircrew Classification Battery. (AD abstract)

1404

Fleishman, E. A. 1953b

THE INFLUENCE OF FIXED VERSUS FREE

HEAD POSITION ON THE PERCEPTION OF BODY POSITION. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-37, Oct. 1953. iii+16 p. (Project no. 509-020-0008). AD 24 654 UNCLASSIFIED

Ninety subjects whose head position was fixed were displaced to various degrees of tilt and at various speeds of displacement in a tilting chair. The results were compared with those obtained from an additional group of 90 subjects whose head position was not fixed. The major findings were as follows: Greater precision of adjustment to the upright position results when the head position is fixed than when the head position is not fixed, although constant error is in the direction of initial displacement under both conditions. When head position is fixed or not fixed, greater precision of adjustment results as the speed of displacement increases. Under both conditions, greater precision of adjustment results when the magnitude of displacement decreases and the direction of displacement is to the left instead of to the right. At various stages of practice greater precision of adjustment results when the head position is held fixed, although the differences are greater at earlier stages of practice. Consistency of individual performance is high under both conditions. (Author's summary, modified)

1405

Fleishman, E. A. 1953c
THE RELATION BETWEEN ABILITIES AND IMPROVEMENT WITH PRACTICE IN COMPLEX PSYCHOMOTOR PERFORMANCE. — Amer. Psychologist, 8 (8): 350-351. 1953.
DLC (BF1. A55, v. 8)

An attempt was made to identify the factors involved at different stages of performance on a criterion psychomotor task through the inclusion of well-established reference variables in the analysis. The analysis also was aimed at identifying (a) the stages of practice in which the task is most complex, (b) the stages at which systematic changes in factor structure occur, (c) the stage at which the factor structure becomes stabilized, and (d) the relative importance of "motor" versus "nonmotor" factors at early and late stages of practice. 200 basic airmen were used in the experiment. Practice on the criterion task, the Complex Coordination Test, was continued for 64 two-minute trials. Eighteen printed and psychomotor tests were also administered. Scores obtained during eight stages of learning and the 18 test variables were subjected to a Thurstone centroid factor analysis. The orthogonal solution of rotated factors revealed nine meaningful factors: Psychomotor Coordination, Rate of Movement, Spatial Relations, Perceptual Speed, Visualization, Mechanical Experience, Numerical Facility, Psychomotor Speed, and a factor specific to the stages of practice on the criterion task. The test was most complex factorially in the initial stages and progressively less complex as practice continued. At early stages of practice certain "nonmotor" factors predominate, but at later stages, "motor" factors predominate.

1406

Fleishman, E. A. 1953d
TESTING FOR PSYCHOMOTOR ABILITIES BY MEANS OF APPARATUS TESTS. — Psychol. Bull., 50 (4): 241-262. 1953.
DLC (BF1. P75, v. 50)

A discussion of the fundamental problems and issues involved in motor skills testing is presented. Considerations for future test developments and research are set forth. The most common motor skill dimensions found in previous studies are summarized and a need appears to be indicated for a more extensive analysis of motor abilities. It is felt that further information might be gained from on-the-job surveys, transfer studies, and other kinds of experimental investigations of motor skill variables. Research on the quantification and measurement of "work methods" is also suggested. The author feels that measurements of "work habits" might provide additional predictions of later performance. Studies relative to the problem of selection versus training with respect to motor skills are suggested. Aptitude tests have to be preceded by motor skill tests to provide for reliable evaluation.

1407

Fleishman, E. A. 1953e
A FACTOR ANALYSIS OF INTRA-TASK PERFORMANCE ON TWO PSYCHOMOTOR TESTS. — Psychometrika, 18 (1): 45-55. 1953.
DLC (BF1. P86, v. 18)

Both the Standard Rudder Control Test and the Experimental Six-Target Rudder Control Test were administered to 698 pilot cadets, in either sequence. In both tests the subject examined sat in a mock cockpit and his own weight threw the seat off balance unless he pushed the rudder foot pedals. In the Standard Test, the subject had to shift the cockpit towards one of three target lights mounted on a panel (score, total time the apparatus is held on the target), while in the Experimental Six-Target Rudder Control Test, the same process was carried out with six target lights (score, number of targets achieved). Four factors were considered in their inter-trial correlations of which three were responsible for the results in some tests: Steadiness-Control, Precision of Movement, and Strength. Correlation of the total scores on each test could be based on the only factor common to both tests: Precision of Movement. When the sequence of the administration of the tests was reversed, the same factors were studied in a separate analysis. Implications and possibilities for development of future psychomotor tests are discussed.

1408

Fletcher, H. 1953
SPEECH AND HEARING IN COMMUNICATION. — x+461 p. New York: Van Nostrand Co., Inc., 1953. DLC (QP306. F6, 1953)

This monograph is based on the work "Speech and Hearing", written by the author in 1929. Among the problems discussed in the added chapters, devoted to research work at the Bell Telephone Laboratories, are the following: quantification of hearing, evaluation of hearing loss, development of communications, and control of distortion of speech in communication systems. In general, the scope of the book covers the various aspects of speech intelligibility, with particular emphasis on factors which influence the interpretation of speech elements by the listener.

1409

Flexman, R. E., 1952
and A. J. Latham
USE OF A CONTACT FLIGHT SIMULATOR IN THE TRAINING OF BASIC STUDENT PILOTS. — Human Resources Research Center. [Pilot Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. PILOT 52-1, April 1952. 5 p. (Project no. 508-017-0002).
AD 76 421 UNCLASSIFIED

Ten airmen who had no previous pilot time were taken to the University of Illinois to act as students in the training of the ten flight instructors from Pilot Training Research Laboratory. This note presents information on student performance which, while incidental to the primary purpose of the activity (that of instructor training) and unsuitable for statistical analysis, contains interesting implications for training research. A large proportion of the pre-solo maneuvers and skills appeared to have been learned in the P-1 trainer by the rather highly selected sample of men utilized. The extent to which these can be learned by regular cadet samples, what other skills can be so gained, and the best combination of trainer and aircraft time, are topics which require a major and rigorously controlled investigation. (Authors' summary and conclusions)

1410

Flodin, S. 1953
[CONSIDERATIONS ON TECHNICAL FACILITIES AND PILOT REQUIREMENTS IN AERIAL WARFARE] Synpunkter på tekniska hjälpmedel och krav pa föraren vid luftstrid. — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (3): 11-14. 1953. In Swedish.
DNLM (W1.SW387, v. 2)

This is a general discussion of the possibilities and technical requirements to reach a target in the air from a plane in flight. The author indicates that he feels the necessity of automatic flight equipment to aid the pilot, so that he can concentrate on seeking and finding the target. The distance at which firing can occur has increased from 100 meters in 1940 to approximately 600 meters in 1953; firing time has decreased from 5 seconds to 1/3 of a second; and speed has increased from 300 km./hr. to 1100 km./hr. Thus, the need for equipment to aid the pilot in his flight calculations and maneuvers is becoming more urgent. Radar and telescope are briefly mentioned as searching aids.

1411

Flückiger, E., 1953
and F. Verzar
[RETENTION OF ADAPTATION TO REDUCED ATMOSPHERIC PRESSURE AS DEMONSTRATED BY HEAT REGULATION] Überdauern der Adaptation an niedrigen atmosphärischen Druck, nachgewiesen an der Wärmeregulation. — Helvetica physiologica et pharmacologica acta (Basel), 11 (1): 67-72. 1953. In German. DNLM

The body temperature of rats exposed to 350 mm. Hg drops several degrees within a few hours after the beginning of exposure. Despite the continuance of reduced partial O_2 pressure, normal body temperature is restored after three to four days. This adaptation to reduced partial O_2 pressure continues after the animals are brought back to 730 mm. Hg. After a second exposure to 350 mm. Hg the drop of body temperature is less, and restoration to normal body temperature is quicker, than the first time. We call this phenomenon "retained adaptation". The longer the initial exposure to 350 mm. Hg, the longer the adaptation lasts after return to 730 mm. Hg. After a 15-day period of exposure to 350 mm. Hg, the adaptation was not entirely lost even after 8 days of 730 mm. Hg. This "retained adaptation" is not dependent on the presence of the adrenals. The phenomenon can also be adrenalectomized rats, kept alive with corticoids. (Authors' summary)

1412

Flyer, E. S. 1952
PERSONALIZED RATING RESPONSES: AN APPROACH TO PERSONALITY EVALUATION [Abstract]. — Amer. Psychologist, 7 (7): 325-326. 1952. DLC (BF1.A55, v. 7)

In both the "picture-choice" and "projective trait" techniques the rater is required to (a) rank stimulus materials (pictures of people or actual people) along a like-dislike continuum, and (b) rate the stimulus materials for various personality traits. Traits are selected that are not conducive to valid stimulus structuring, and the response material is evaluated by determining the relationships between likeability and personality trait ratings. Since the stimulus materials are unstructured in terms of the traits used, rating behavior is considered to become dependent upon (a) the way that the stimulus materials are viewed in terms of relative likeability, and (b) the way the traits are viewed in terms of their relative acceptabilities. When the "picture-choice" data obtained were related to various forms of self-rating, the median correlation coefficient was found to be 0.72. Raters imputed traits they considered "most personally acceptable" to pictures that they liked, and traits considered "least personally acceptable" to pictures that they disliked. The analysis of the "projective trait" data obtained from 75 Air Force Officer Candidates indicated that self-ratings were related to personalized trait ratings. The median correlation coefficient between self-rating on a trait and imputing the trait to liked associates was 0.52.

1413

Flyer, E. S., 1953
E. Barron, and L. Bigbee
DISCREPANCIES BETWEEN SELF-DESCRIPTIONS AND GROUP RATINGS AS MEASURES OF LACK OF INSIGHT. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-33, Sept. 1953. iii+8 p. (Project no. 503-002-0007). AD 20 487 UNCLASSIFIED

Ratings on three personality dimensions were obtained from 162 white and Negro officer-candidate members of 7 flights. The dimensions included (1) self-perception, (2) group-perception, or the rating of each individual as he impressed other members of his flight, and (3) social-perception, or the estimate of how the individual thought he was perceived by others. The group-perception rating was regarded as the true perception of the individual's behavior, and the amount of agreement with the group-perception rating indicated the amount of insight shown by a subject. Correlations of the self- and group-perception ratings were lower than correlations of the social- and group-perception ratings, indicating that subjects were more insightful with the social-perception than with the self-perception dimension. (AD abstract, modified)

1414

Folsom, W. W. 1952a
DEVELOPMENT OF A REVISED OFFICER QUALITY STANINE EFFECTIVE WITH THE MARCH 1952 AIRCREW CLASSIFICATION BATTERY. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-36, Nov. 1952. 4 p. (Project no. 503-001-0012). ATI 188 280 UNCLASSIFIED

Since the rated Air Force officer usually performs a variety of nonflying as well as flying duties in the course of his career, it was desirable that a minimum cutoff point on verbal and quantitative intellectual factors be established so as to increase the probability of selecting cadets whose "officer quality" would fit them for officer duties in addition to flying. In order to increase the verbal and quantitative components of the Officer Quality Stanine, a new combination of tests and weights was determined by inspection of factor loadings of the printed tests in the Aircrew Classification Battery. Tests weighted in the old and the new Officer Quality Stanines are presented. The new Officer Quality Stanine correlated 0.80 with the old Officer Quality Stanine. (p. 1 and 3)

1415

Folsom, W. W., 1953
and L. D. Valentine
PREDICTION OF ACHIEVEMENT IN THE COMMUNICATION OFFICER COURSE AT SCOTT AIR FORCE BASE. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Technical Report no. 53-1, Jan 1953. iii+4 p. (Project no. 503-001-0018). AD 14 728 PB 110666

Research was devoted to an evaluation of the effectiveness of aptitude tests in predicting success in the communications officer course and a comparison of the utility of these tests with selection based on years of college and type of civilian work experience. Analysis of the data indicated a very low relationship between years of college and course success (correlation 0.15). There was some relationship between civilian work experience and final school grade. The results of the aptitude tests showed considerable relationship with final school grade (correlation 0.51). The general conclusion indicates that the use of an aptitude test composite, without regard to years of college completed, would increase the number of persons qualified to enter a course, raise the level of achievement in the course, and reduce effort and training time. (AD abstract)

1416

Forcher-Mayr, O. 1953
[ON RESPIRATION IN HIGH MOUNTAINS WHILE CARRYING VARIOUS LOADS] Über die Atmung im Hochgebirge bei verschiedener Belastung. — Wiener klinische Woschenschrift (Wien), 65 (8): 160-161. 1953. In German. DNLM

The vital pulmonary capacity was determined on student athletes during a 10-day hike to altitudes of 2860 and 3248 m., while carrying various loads (up to 15 kg.). During the first 3 days at high altitude, vital capacity decreased, then rose again, with a tendency to drop back because of increasing fatigue. Upon return to the plain, vital capacity values were higher than at the start only in 45% of the subjects. Because the exercise was too strenuous even for athletes and the duration of the experiment too short, altitude acclimatization could not take effect.

1417

Forgays, D. G., 1953
and T. B. Roby
GROUP EFFECTIVENESS IN BOMBER CREWS: ANALYSIS OF IN-FLIGHT COMMUNICATIONS IN THE STUDY OF COORDINATION [Abstract]. — Amer. Psychologist, 8 (8): 351. 1953. DLC (BF1.A55, v. 8)

Interphone communication recordings were obtained during typical training flights for 67 B-29 crews. Employing these interphone protocols and a rather extensive scoring system, indices of coordinational performance suggested by the theoretical model, e.g., measures of the anticipation of informational needs, measures of the distribution of communication, etc., were calculated. Index computation was directed at three levels, the overall crew, subteams within the crew, and the individual. Indices representing these three levels were related to various end-product criterion measures, including bomb scores, measures of navigational accuracy, and instructor ratings. The indices used in this study were found to possess reliability sufficiently high to be useful for research purposes. Significant relationships were found between various of the coordinational-

index scores and external criterion measures. These results are accepted as generally supportive of the theoretical model suggested for dealing with the analysis of the interactions and performances of groups. Further development and extension of the model to deal with a larger class of communications and groups, as well as future steps to refine and validate it empirically, will be discussed. (Authors' abstract, condensed)

1418

Fowler, U. S. 1953
MECHANICAL FACTORS IN BREATH HOLDING. — Federation Proceedings, 12 (1[1]): 44-45. 1953.
DLC (QH301. F37, v. 12)

After the subjects had accomplished maximal voluntary breath holding, they rebreathed from a recording 15-liter spirometer, containing 7.5% CO_2 + 8.2% O_2. Oxygen saturation of arterial blood was recorded continuously by means of an ear oximeter. After holding the breath, resumption of breathing movements reduced respiratory distress despite the decreasing O_2 saturation and the absence of reduction in arterial CO_2 tension. After 4-8 breaths, the subject could resume breath holding, but for a shorter period. After several more breaths, which now gave less relief, the person held his breath a third time. Average times (8 subjects) for the 3 periods of breath holding were 52, 10, and 7 seconds. (From the author's abstract)

1419

Frank, G. B. 1953
THE EFFECTS OF EXPLOSIVE DECOMPRESSION ON THE ELECTROENCEPHALOGRAMS OF DOGS. — In: Ohio State Univ., Studies in explosive decompression, p. 119-130. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(n) UNCLASSIFIED

The effect of explosive decompression on the electroencephalographic activity was studied in anesthetized dogs. Leads were inserted on the right and left side in a region including the sulcus postsylvius, sulcus suprasylvius, sulcus lateralis, and sulcus ectolateralis. At ground pressure and at a pressure corresponding to 10,000 ft., the average pattern consisted of large waves with a frequency of 3-4 per second and a maximum voltage of 50-100 microvolts. Displacement of pins often observed at the time of explosive decompression was apparently caused by increased intracranial pressure. Graphs obtained before and 20-50 seconds after decompression to 10,000 ft. were similar. In several dogs decompressed to 50,000-55,000 ft. spontaneous waves (recorded from posterior leads) disappeared within 60 to 94 seconds. Spontaneous waves from anterior leads disappeared 6 to 29 seconds before those from the posterior leads. Electrical activity of the cortex ceased in 60-94 seconds when dogs were not given oxygen; it returned if the dogs were recompressed before death. Deaths were due to arrest of respiration which was caused by depression of the respiratory center because of oxygen lack. Cortical activity was depressed long before the generalized death, and respiratory failure might have occurred before cortical cell death. (AD abstract, modified)

1420

Franke, E. K., 1952
H. E. von Gierke, F. M. Grossman, and W. W. von Wittern
THE JAW MOTIONS RELATIVE TO THE SKULL AND THEIR INFLUENCE ON HEARING BY BONE CONDUCTION. — Jour. Acoust. Soc. America, 24 (2): 142-146. 1952.
DLC (QC221.A4, v. 24)

Opening and closing the mouth increases the sound pressure produced by bone conduction in the closed auditory canal by as much as six to ten decibels in the frequency range between 40 c. p. s. and 700 c. p. s. This difference is explained by vibrations of the lower jaw relative to the skull. The resonance curve of this motion was measured and used to calculate the influence of the lower jaw motion on the sound level in the closed auditory canal. The results show that the measured frequency response of the difference in sound pressure open mouth vs. closed mouth, may be explained entirely by vibrations of the lower jaw. (Authors' summary)

1421

Freeman, F. H., 1953
and W. O. Fenn
CHANGES IN CARBON DIOXIDE STORES OF RATS DUE TO ATMOSPHERES LOW IN OXYGEN OR HIGH IN CARBON DIOXIDE. — Amer. Jour. Physiol., 174 (3): 422-430. 1953.
DLC (QP1. A5, v. 174)

Twenty-six rats were acclimatized to 10% O_2 in N_2 for 10-31 days and 20 rats to 10% CO_2 in air for 6-28 days. Analyses were made at intervals for CO_2 in muscle, bone, blood and the whole body as well as hematocrit and blood O_2 capacity. Results were compared with similar analyses in pair-fed controls. On the average a 200-g. rat lost 68 cc. of CO_2 on acclimatization to 10% O_2 and gained an equal amount of CO_2 on acclimatization to 10% CO_2. Of this amount 55 cc. came from the skeleton in low O_2 while 21.7 cc. was gained by the skeleton in high CO_2. The skeleton normally contains 83.5% of the total 319 cc. contained in a 200-g. rat. Bones lost 11% of their normal CO_2 in 10% O_2 and gained 7% in 10% CO_2. The in-vivo arterial plasma HCO_3 content (in cc./100 cc.) was 39 in 10% O_2, 59 normal and 89 in 10% CO_2. The arterial pCO_2 values were 30 mm. in low O_2, 47 mm. normal, and 94 mm. in high CO_2. The hematocrit ratio was increased from 39.6 to 69.9% by low O_2 and decreased from 45.1 to 33.1% in high CO_2. During acclimatization to 10% O_2 bones lost 6 mEq. of PO_4 and 1 mEq. of HCO_3 for every 8 mEq. of Ca. In 10% CO_2 there was a gain in CO_2 in the bones, but no change in Ca or PO_4. Acute exposure to 7% O_2 for 5-6 hours did not cause any measurable changes in the bone CO_2, but over longer periods the skeleton represents an important storage depot for CO_2. Muscle

CO_2 was increased from 20 to 44.7 cc./100 g. by acclimatization to 10% CO_2 and was decreased from 51.6 to 43.2 cc./100 g. by acclimatization to 10% O_2. (From the authors' summary)

1422

Freitag, W. 1953
[INVESTIGATIONS ON THE EFFECT OF CENTRIFUGAL FORCES IN A FOOT-TO-HEAD DIRECTION UPON THE HUMAN ORGANISM] Untersuchungen über die Wirkung von Fliehkräften in Richtung Fuss-Kopf auf den menschlichen Organismus. — Zeitschrift für Flugwissenschaft (Braunschweig), 1 (2): 25-30. 1953. In German. DNLM

Experiments were made on 9 subjects flying in a head-downward position (effected by means of a tilting chair) in airplanes diving from altitudes of 2000 or 3000 m. until reaching maximum-tolerance acceleration, then spiraling downward in irregular circles. Results show that centrifugal forces acting in the foot-to-head direction increase blood pressure within the vessels of the head and neck region even at accelerations below 2 g, making the blood ooze through the walls of the minor vessels, and causing swelling of the face and pain in the ears and temples. The number of small hemorrhages increased with the rate of acceleration and with exposure time. Under increasing centrifugal force, the heart and blood vessels are no longer able to maintain normal blood circulation. The pressure of the inner organs upon the chest hampers respiration, and the pressure in head and neck becomes unbearable. As follows from these experiments, as well as from others made on the centrifuge, man is capable of tolerating a centrifugal force up to 2 g for 3 minutes without considerable detriment to his working capacity. In exposures above 2 g, the time must be rapidly reduced; at 3.5 g it should not exceed 10 seconds to avoid serious troubles. Redding out was not observed in any experiment.

1423

French, R. S. 1953
NUMBER OF COMMON ELEMENTS AND CONSISTENCY OF REINFORCEMENT IN A DISCRIMINATION LEARNING TASK. — Jour. Exper. Psychol., 45 (1): 25-34. 1953. DLC (BF1.J6, v. 45)
Reprint issued also as: Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-12, June 1953. AD 14 726 UNCLASSIFIED

This study tested the hypothesis that discrimination-learning performance is a joint function of (a) the number of common stimulus elements within a group of forms, and (b) the proportion of these similar forms for which the response of "choice" is reinforced or indicated as "correct". The discriminaton task employed was that of learning to choose on each trial the "correct" form in successively presented pairs of such forms. The forms in each pair were to be chosen individually from each of two six-member groups of forms within which the number of common segments was varied. The procedure involved testing the discrimination performance for a 96-trial testing period, with each of the 16 possible combinations formed by the four possible degrees of variation of the two independent variables. Twenty-four airman basic trainees each were assigned randomly to each of the 16 experimental conditions. The results constitute an experimental verification of the hypothesized interaction between number of common segments and consistency of reinforcement at a high level of confidence. A theoretical formulation of the results in terms of stimulus generalization is outlined. (From the Author's summary)

1424

French, R. S. 1953a
THE DISCRIMINATION OF DOT PATTERNS AS A FUNCTION OF NUMBER AND AVERAGE SEPARATION OF DOTS. — Jour. Exper. Psychol., 46 (1): 1-9. 1953. DLC (BF1.J6, v. 46)

The Pattern Discrimination Apparatus was used to present a series of 120 different patterns for each number of dots from two to seven. Each pattern appeared twice, the pair of patterns being either identical or differing by the slight displacement of one of the dots. The subjects responded "Same" or "Different." The subjects were 384 basic airmen trainees at Lackland Air Force Base. The results indicate that: (a) subjects are better able to detect a slight difference in the relative positions of three dots than of either two dots or any greater number up through seven; (b) the average separation of the dots is a highly significant source of variance; the more widely spaced the dots in the pattern, the less accurate is the discrimination of a constant displacement; and (c) when knowledge of results is given immediately after each judgment, subjects in general achieve a higher level of accuracy. (Author's abstract, modified)

1425

Froning, F. 1953
[HEARING DEFECTS CAUSED BY NOISE AND THEIR PREVENTION, ON THE BASIS OF THE AUTHOR'S OWN INVESTIGATIONS IN A NOISY INDUSTRIAL PLANT] Lärmschwerhörigkeit und ihre Verhütung auf Grund eigener Untersuchungen in einem Lärmbetrieb. — Zeitschrift für Laryngologie, Rhinologie, Otologie (Stuttgart), 32 (5): 329-333. 1953. In German. DNLM

Audiograms were taken (before and after working hours) of normally hearing laborers working in a noisy industrial plant. Their ears had either been protected by a Zwislocki noise attenuating device ("selectone"), or had remained unprotected. The audiograms following 5 hours of noise without selectone protection revealed ganglial defects in the older laborers, who had completed many years of service, and middle ear defects in the younger, recently employed men. The injury, therefore,

seemed to have progressed as an ascending degeneration. Wearing of the selectone, as the audiograms show, provided protection. The device was found comfortable. It exists in 4 different models. --- It is concluded that all the laborers in noisy industries should be protected by a selectone device. Further improvement in comfort and protection could be achieved by taking a mold of the men's ears from which the earplates of the selectone could be fashioned.

1426

Fry, G. A., and M. J. Allen 1952a
EFFECT OF FLASHES OF LIGHT ON NIGHT VISUAL ACUITY. — Ohio State Univ. Research Foundation, Columbus (Contract AF 33(038)-15630); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-10, Part 2, Nov. 1951 [1952]. vi+34 p. (E. O. no. 696-67). AD 13 834 PB 107339

Experiments were conducted to investigate a satisfactory method of predicting the course of constriction of the pupil of a dark-adapted eye when exposed to a flash of any duration or a series of flashes involving a complex distribution of brightness in the visual field. Two aspects of the problem are considered. If the flash lasts longer than the latent period for pupil constriction, the pupil constriction will affect the amount of light reaching the retina during the latter portion of the flash. Also after the flash the pupil does not return back to its normal size until after a considerable period of time. The investigation indicates that responses of a dark-adapted eye are proportional to the total amount of light involved (brightness x area x time). This conclusion holds roughly for the central region of the field of view up to 35° out from the primary line of sight and for flashes up to 0.2 seconds. For flashes longer than 0.2 seconds, the effect of varying duration is the same as that of varying brightness, and allowance must be made for the effect of the pupil constriction itself. (AD abstract)

1427

Fry, G. A., and N. Ihrig 1953
EFFECT OF FLASHES OF LIGHT THROUGH THE CLOSED EYELID. I. PRESERVATION OF DARK ADAPTATION DURING A FLASH BY CLOSING THE EYELIDS. — Ohio State Univ. Research Foundation, Columbus (Contract AF 33(038)-15630); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-159, Part I, March 1953. vii+36 p. (RDO no. 696-67). AD 16 851 UNCLASSIFIED

The effect of a 3-second light flash on one open and one closed eye was determined in relation to the preservation of dark adaptation. The effect of the flash was measured by tracing the recovery of the ability to see a narrow black bar on an 8° field centered at a point 5° to the right of the fixation point. The 125-foot-candle flash produced a marked effect on dark adaptation which was abolished only after reducing the level of illuminance 3 to 4 log units. No effect was transferred from the open to the closed eye. An after-image method indicated that a 1-foot-candle illumination on a passively closed eye produced a retinal illumination of about 3 trolands (the product of the luminance of the field in candles/sq. m. and the area of the pupil in sq.mm.). Tightly closing the lid reduced this by half a log. unit. (AD abstract)

1428

Frye, S. A. 1953
CIRCULATORY ARREST IN DOGS AS SHOWN BY X-RAY STUDIES FOLLOWING EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression, p. 104-110. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(l) UNCLASSIFIED

A method was devised for determining the time and place of circulatory arrest following explosive decompression to high altitudes. A cannula, connected to the outside of the modified decompression tank by a glass tube, was placed in the left external jugular vein of the dog. Prior to injection of Diodrast (35 or 70%), the cannula and the tube were filled with 0.9% saline at body temperature. The most satisfactory quantities of Diodrast used were 15 cc. of 70% and 20 cc. of 35% solution. A conventional decompression tank was modified to permit x-ray photography through an X-ray transparent Formica bottom. The first film (used as a standard) was taken before decompression. Diodrast was injected either immediately, 10 seconds, or 15 seconds after decompression. Readings indicated that circulatory arrest occurred within 16 seconds in all dogs and within 10 seconds in 60% of the dogs. Gas in the heart was observed within 16 seconds in 90% of the dogs and within 10 seconds in 80% of the dogs. (AD abstract)

1429

Frykholm, A. 1953
[FUNCTIONAL DEMANDS ON EARS, NOSE AND THROAT DURING FLIGHT] Fordringar på öronnas-halsorganens funktion under flygning. — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (2): 1-9. 1953. In Swedish. DNLM (W1.SW387, v. 2)

This paper was presented at a meeting of the Swedish Society of Otolaryngology, on March 21, 1953. It was devoted to a discussion of the strains imposed by noise, by acceleration, and by atmospheric pressure changes, as they affect the ear, nose, and throat during flight. Included are graphs which illustrate the effects of intense noise, positive and negative g forces, and rapidly fluctuating atmospheric pressures upon ear and respiratory passages of the pilot. Without the protection

of noise inhibitors, anti-gravity suits, and cockpit pressurization devices, the effects of the phenomena mentioned are bound to be traumatic.

1430

Fulton, J. F. 1953
MEDICINE, WARFARE, AND HISTORY. — Jour. Amer. Med. Assoc., 153 (5): 482-488. Oct. 3, 1953. DLC (R15.A48, v. 153)

Within the context of a historical synopsis of military surgery, from ancient times to the present, progress in the field of aviation medicine is briefly reviewed. The following topics are summarized: (1) oxygen administration; (2) pressure cabins; (3) explosive decompression; (4) acceleration in high-speed aircraft; and (5) special safety precautions in passenger transportation.

1431

Furchtgott, E. 1952
THE EFFECT OF X-IRRADIATION ON BRIGHTNESS DISCRIMINATION. — Jour. Psychol., 34 (1): 37-41. 1952. DLC (BF1.J67, v. 34)

Experiments were carried out to test the effects of whole-body X-irradiation on the acquisition of brightness discrimination under conditions of low illumination. Rats, deprived of water for 22 hours, were trained gradually to jump increasing distances. For half the animals a lighter grey card and for the other half a darker card was the positive stimulus. The illumination of the target area was approximately 0.1 foot-candle. If an animal jumped to the positive stimulus card, he landed on a platform where he was permitted to drink water for five seconds. Following the fourth training session, half the animals were exposed to radiation while the group served as controls. The performance of rats who had received 369-469 r of irradiation tended to be inferior to that of a matched group of controls. The retardation was most noticeable immediately following the irradiations. It is believed that the effects are due to changes in the receptor system rather than in the central nervous system. (Author's summary, modified)

1432

Fusco, M. M. 1953
STUDIES ON LUNGS OF ALBINO RATS. — In: Ohio State Univ., Studies in explosive decompression, p. 183-196. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(s) UNCLASSIFIED

The effects of anoxia per se and anoxia resulting from explosive decompression were studied in albino rats. In the first series of experiments three groups of rats were used: (1) controls sacrificed without any experimental treatment; (2) rats explosively decompressed (E. D.) to a barometric pressure of 30 mm. Hg and maintained at this altitude (of about 72,000 ft.) for 45 seconds; and (3) animals breathing a nitrogen-rich mixture in a glass chamber for 30 seconds at ground level (N_2 rats). Following the experiments, the rats were maintained for 15 minutes in either room air or in 100% oxygen (at 50 mm. Hg) and then killed. Gross observations of the lungs showed slight edema and hemorrhages in the N_2 rats and copious amounts of fluid in the E. D. rats. The total pulmonary weight and volume were significantly higher in E. D. than in N_2 rats. More marked edema was noticed in E. D. animals breathing 100% O_2 following the experiment than in the corresponding E. D. rats breathing fresh air during the survival time.

1433

Gänsehirt, H., 1952
G. Severin, and W. Zylka
[THE EFFECT OF OXYGEN, CARBON DIOXIDE, AND GLUCOSE ON GASPING RESPIRATION OF THE RAT] Der Einfluss von Sauerstoff, Kohlensäure und Glucose auf die Schnappatmung der Ratte. — Pflügers Archiv für die gesamte Physiologie (Berlin), 255 (4): 283-293. 1952. In German. DLC (QP1.A63, v. 255)

Asphyxiation of rats normally leads to the following respiratory survival phases: a first gasping phase characterized by an increase in depth and frequency of respiration and by spastic movements of the thorax and the diaphragm; a second phase characterized by apnea; and a third phase characterized again by movements of the thorax and diaphragm (second gasping phase). At the end of the third phase the animals can be revived by artificial respiration. In 90 adult rats subjected to asphyxia by tracheal clamping, breathing of oxygen prior to asphyxia caused a significant extension of survival time and of the first gasping phase. Inhalation of an air mixture containing 5.6% CO_2 extended the survival time as a result of prolongation of the first, second, and third respiratory phases, the cause being attributed to an increase of blood in the brain due to hypercapnia. Glucose introduced into the stomach prolongs the survival time and the second gasping phase 65 to 70 minutes after being administered. If given intravenously, the survival effect sets in 15 minutes after injection of the glucose solution. However, no correlation between blood-sugar content and prolongation of the gasping phases could be established, since, in the case of intravenous injection, this phase terminated at a time when the blood-sugar increase was at its peak; when blood sugar was given orally, prolongation of survival time followed the maximum of blood sugar content after a considerable interval.

1434

Gagge, A. P. 1953
AEROMEDICAL RESEARCH AS A CAREER IN THE USAF. — Military Surgeon, 112 (4): 278-281 1953. DLC (RD1.A7, v. 112)

The organization, history, staff, and scope of aeromedical research in the U. S. Air Force are described. The major research facilities are as follows: A. In Headquarters, U.S. Air Force: Deputy Chief of Staff, Development, Directorate of

Research and Development, Human Factors Division. — B. Under Air Research and Development Command: (1) Headquarters ARDC, Directorate for Human Factors; (2) Aero Medical Laboratory, Wright Air Development Center; (3) Radiobiology Laboratory, CRC; (4) HF Flight Test Laboratory, Muroc; (5) Space Biology Laboratory, Alamogordo; (6) Human Factors Office, Rome, New York; (7) Human Resources Research Laboratories, Bolling AFB. — C. Under Air University: (1) School of Aviation Medicine; (2) Human Resources Research Institute. — D. Under Alaskan Air Command: Arctic Aeromedical Laboratory. — E. Under Air Training Command: Human Resources Research Center. The question of recruiting qualified manpower and of stimulating interest in research careers is discussed.

1435

Gartmann, H. 1953
[CONCERNING FEAR DURING FLIGHT] Ueber die Angst beim Fliegen. — Monatsschrift für Psychiatrie und Neurologie (Basel), 125 (5-6): 385-397. 1953. In German. DNLM

The case histories of two military pilots who were discharged from active duty because of insuperable anxiety are described. The problem of fear is discussed in detail, and its unrelatedness to the degree of objective danger illustrated. Great anxiety with regard to slight danger, and total fearlessness in the face of great objective danger, may coexist in the same subject. Freud's libido theory explains only one facet of the problem. The following general conclusion is reached: Fear appears wherever self-realization, in the broadest sense of the word, is put in question or fulfillment frustrated. In the two subjects in question, a real vocational feeling had been absent. In one of them, who had manifested a sincere desire to fly at the beginning, a serious accident triggered off the anxiety complex. In order to be able to predict success before the selection of pilots, it is necessary to ask the question: may the candidate be expected to fulfill his innermost personality by becoming a pilot, i.e., become more truly himself, than if he selected another profession? Will he find in flying his true vocation? The extent to which this question can be answered in the affirmative will determine the degree of danger, shock, uncertainty, exhaustion, and disappointment the individual will be able to endure.

1436

Garvey, W. D. 1953
THE INTELLIGIBILITY OF SPEEDED SPEECH. — Jour. Exper. Psychol., 45 (2): 102-108. 1953. DLC (BF1.J6, v. 45)

A new technique for accelerating speech was developed, based on chopping out portions of the speech record on a plastic-base recording tape, then splicing together the remaining segments of the record tape to form a new intact record. With this "chop-splice" accelerating technique, using discrete spondaic words, accelerations as great as 2.5 times the original speech speed were attained with less than 10% loss in intelligibility. When acceleration was held constant at twice the original speed, the size of removed chops did not have a significant effect upon intelligibility until 2.5 cm. chops were employed. A comparison of the "chop-splice" technique with an accelerating technique, which had an accompanying frequency translation, indicated that, with accelerations greater than 1.67 times the original speech speed, the distortion resulting from the frequency translation had a greater effect upon intelligibility than did the distortion resulting from the removal of portions of the speech pattern with the "chop-splice" accelerating technique. (Author's abstract)

1437

Gatto, L. E. 1953
FEAR OF FLYING SYNDROME (PART I). — Royal Thai Air Force Med. Gaz. (Bangkok), 2 (2): 97-114. 1953. In English. DNLM

Preventive aviation psychiatry can play an active role in maintaining flying personnel at a high level of efficiency. Several case histories of fliers exhibiting "fear of flying" are cited. An analysis of the factors involved shows that physical stress situations, such as encountered in crashes, did not appear to have sufficient impact on the flier to cause him to quit. The majority of cases suggest that internal emotional conflicts may converge to create a rather complex problem with its focal point in flying. Underlying factors were classified as follows: phobias, pseudophobias, and behavioral and psychosomatic disturbances. Groundings for medical reasons were also found to constitute a source of fear of flying. Treatment of patients who claim a fear of flying includes uncovering and analyzing of emotional conflicts. The medical officer is responsible for an honest and serious attitude toward this problem. He should administer psychotherapy or suggest psychiatric treatment when necessary, in an attempt to maintain the maximum degree of efficiency among the flying personnel.

1438

Gay, L. N., and L. M. Polvogt 1953
THE ACTION OF ANTIHISTAMINE SOLUTIONS APPLIED TO THE MUCOUS MEMBRANES OF THE NOSE. — Johns Hopkins Univ. and Hospital, Baltimore, Md.; issued by School of Aviation Medicine, Randolph Field, Tex. May 1953. 5 p. (Project no. 21-1208-0010, Report no. 1).
AD 122 634 UNCLASSIFIED

Eight well-known antihistamine drugs were administered weekly to subjects by means of cotton pledgets soaked in the drug and inserted into the nose. The subjects were subsequently questioned and examined for local and systemic side reactions. The survey reveals that the immediate reaction, both local and constitutional, does not contraindicate the use of any of the eight drugs which were studied. The action is beneficial; shrinkage of congested mucous membranes follows application. Of the drugs studied, Phenergan Wyamine

appears to be the most desirable. The constitutional reactions which follow continued use of all these drugs are so disturbing as to make the patient's judgment inaccurate and to result in sluggish reflexes. Prolonged use should, therefore, be considered a proper basis for grounding flying personnel. However, long personal experience with antihistamine drugs taken orally by many patients has accumulated sufficient evidence to state that constitutional reactions completely subside within forty-eight hours after the drug has been discontinued. (Authors' conclusions, modified)

1439

Geldard, F. A. 1953
THE HUMAN SENSES. — x+365 p. New York: John Wiley and Sons, Inc., 1953.
DLC (BF233.G43)

The sense organs and perceptual mechanisms are discussed with emphasis on mathematical and quantitative evaluations. This approach has emerged as a necessity during World War II when the principles of visual, auditory, and tactile psychophysiology were applied to designs of automatic devices in order to amplify perceptual functions and diminish the incidence of human error. The major part of the book is devoted to general physiological concepts of sensory functions; special attention is directed to visual and labyrinthine sensations commonly affected during flight. Under the heading,"Non-Auditory Labyrinth and Aviation", the effects of acceleration and deceleration, such as visual disturbances, oculogyral illusions, autokinetic phenomena, and airsickness are discussed. The book is amply illustrated with anatomical drawings of the sense organs. (330 references)

1440

Gell, C. F. 1952a
MODIFICATION OF F7F, INSTALLATION OF SUPINE SEAT AND RELATED COMPONENTS, IN-FLIGHT EVALUATION OF THE SEAT. — Naval Air Development Center. Aviation Medical Acceleration Lab., Johnsville, Pa. Report no. NADC-MA-L5208, Dec. 10, 1952. 5p. (Project Report no. NM 001 060.01.02). AD 133 234
UNCLASSIFIED

A supine seat was installed in an F7F fighter plane and tested. Its relatively small size, and points of constriction, as well as the lack of visibility and difficulty of escape it imposed, were found to be undesirable features. In flight, control of the plane was made possible by means of an autopilot (PIK) device allowing the pilot to change position if desired. Additional tests on the human centrifuge are recommended to investigate the physiological implications of the supine seat under acceleration. It is further recommended that the assembly be modified for stick and rubber installation, improved instrument, visibility, and greater physical comfort.

1441

Gell, C. F., and D. Cranmore 1953
THE EFFECTS OF ACCELERATION ON SMALL ANIMALS UTILIZING A QUICK-FREEZE TECHNIQUE. — Jour. Aviation Med., 24 (1): 48-56. 1953. DLC (TL555.A1A4, v. 24)

Essentially a condensation of the report, Gell, C. F., 1952.

1442

Gerathewohl, S. J. 1953
INVESTIGATION OF PERCEPTUAL FACTORS INVOLVED IN THE INTERPRETATION OF PPI-SCOPE PRESENTATIONS: FORM DISCRIMINATION UNDER CONDITIONS OF HEAVY VIDEO-NOISE. — School of Aviation Medicine, Randolph Field, Tex. July 1953. iii+5 p. (Project no. 21-1205-0004, Report no. 1). AD 19 692
PB 110974

Experiments on target discriminability were made using the Supersonic Trainer AN/APQ-13 T1 and a radar set AN/APS-15 for presenting the targets at simulated distances of 10, 20, and 50 miles to 24 untrained observers under conditions of heavy background noise. The following results were obtained: (1) Significant differences in discriminability were found between four regularly shaped targets. (2) The rank order was different from that obtained under favorable viewing conditions. (3) The discriminability of the targets may be influenced but slightly by their orientation and position on the target circle. (4) Target discriminability was definitely lower at the 50-mile range than at the other two ranges. (5) Differences between subjects were masked by the experimental conditions. (Author's summary)

1443

Gerathewohl, S. J., and W. F. Taylor 1953a
THE EFFECT OF INTERMITTENT LIGHT ON VISION. — School of Aviation Medicine, Randolph Field, Tex. Dec. 1953. iii+6 p. (Project no. 21-1205-0014, Report no. 1). AD 31 060
PB 114195

Application of the subjective effect of enhanced brightness by the use of intermittent light (Bartley effect) for the improvement of visibility under conditions of low contrast was investigated. A reading chart with gradually decreasing brightness contrast was read under steady and flicker conditions with four different light-dark ratios and two flicker frequencies (9 and 15 c.p.s.). The number of lines read under each condition served as index of readability and, in a broader sense, as index of visibility under low-contrast conditions. It was found that the effect of flicker was to reduce the number of lines read, especially at low levels of illumination. As it is doubtful that flicker can be used for the improvement of visibility under conditions of low contrast, attempts should not be made to utilize the Bartley effect by illuminating objects with flicker light. (Authors' summary, modified)

1444

Gerathewohl, S. J., and H. Strughold 1953b
MOTORIC RESPONSES OF THE EYES WHEN EXPOSED TO LIGHT FLASHES OF HIGH INTENSITIES AND SHORT DURATION. — Jour. Aviation Med., 24 (3): 200-207. 1953
DLC (TL555.A1A4, v. 24)

The oculomotoric response of the eyes to an unexpected flash of light of high intensity and short duration was recorded in 20 subjects. The results indicated that in the case of an unexpected flash, most of the subjects exhibited a blinking reflex with a latent period of 60-80 milliseconds. The light flash reached its peak in a fraction of a millisecond, so no protection was afforded by the blinking reflex. The blinking period itself lasted about 0.3 second; aside from the pupillary reactions, no other responses were observed. The latent periods of voluntary eye movements are about three times longer than those of the blink reflex, therefore, eye movements cannot be used as protection against light flashes.

1445

Gerathewohl, S. J. 1953c
CONSPICUITY OF STEADY AND FLASHING LIGHT SIGNALS: VARIATION OF CONTRAST. — Jour. Optical Soc. Amer., 43 (7): 567-571. 1953.
DLC (QC350.O6, v. 43)

In the past, two measures have been used to express the comparative effectiveness of steady and flashing light signals. These are comparative intensities (a) required for threshold; and (b) required for equal apparent brightness above threshold. The two measures agree in showing that the effectiveness of flashing signals is less than that of steady signals, when the intensity of the light phases of the flashing signal equals the intensity of the steady signal. The present study compares steady and flashing light signals with respect to conspicuity, defined as the speed of response to a signal above threshold. For large signal contrasts the conspicuity of steady and flashing signals is approximately equal. For small contrasts the conspicuity of flashing signals is considerably greater. These results suggest that flashing rather than steady signals be used for warning purposes. (Author's abstract)

1446

[Gerathewohl, S. J.] 1953d
SOME PROBLEMS OF ORIENTATION IN THE GRAVITY-FREE STATE [Abstract]. — Military Surgeon, 113 (4): 342-343. 1953.
DLC (RD1.A7, v. 113)

Zero gravity, such as a traveler in a rocket ship would experience in space, has been artificially produced in two series of experimental flights with jet aircraft. One group of flights was made by Test Pilot Burt Crossfield at Edwards Air Force Base, Calif., for the National Advisory Council on Aeronautics. The other was staged by personnel of the Aero Medical Laboratory at Wright-Patterson AFB, Ohio. In both, the weightless condition was achieved for periods up to 42 seconds by flying a predetermined trajectory at very high speed. No ill effects of any consequence were noted in either series of test runs. Pilot Crossfield remarked that 'it did feel unnatural' to be without weight. In some of his earlier trials he noted a sensation of 'befuddlement' which was later overcome. But the flyers found themselves on the whole undisturbed by zero gravity. It is now considered unlikely by most aeromedical researchers that the suspension of gravity in space would do severe harm to the mind or body of the astronaut. (Abstract, abbreviated)

1447

Gernandt, B. 1953
THE EFFECT OF VESTIBULAR STIMULATION UPON THE ACTIVITY OF THE PRIMARY MOTOR NEURONS OF THE SPINAL CORD. — Acta physiologica scandinavica (Stockholm), 27 (2-3): 169-182. 1953. In English. DNLM

The effect of rotatory stimulation of the horizontal semicircular canal upon the outflow of impulses (recorded by an oscilloscope) from the ventral roots (L7 and S1) and from the peripheral motor nerves of the hind limb, was studied in lightly anesthetised or decerebrated cats. By means of impulses transmitted by the vestibulospinal and the reticulo-spinal tracts, the primary motor neurons of the spinal cord react under the reflex control of the vestibular apparatus and appear to play an important role in eliciting the compensatory movements of the limbs. The activity of the vestibulo-spinal tract directly reflects the action of ampullopetal or ampullofugal deviation of the cupula in the ampulla of the homolateral horizontal semicircular canal. It is influenced by a bilateral vestibular contribution. The primary nuclei of both labyrinths are connected to the reticular formation, which serves as an internuncial relay and constitutes a fundamental element in the reflex arc. The bilateral impulses from both labyrinths may be changed in the relay into excitatory and inhibitory impulses which influence the primary motor neurons of the spinal cord. Localized incisions into the spinal cord have made it possible to study the effect on the ventral horn cells of the impulse streams discharged in response to vestibular stimulation in the two pathways separately. (Author's abstract, modified)

1448

Gibbs, C. B. 1953
THE CONTINUOUS REGULATION OF SKILLED RESPONSE BY KINAESTHETIC FEED BACK. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 190/53, March 1953. 14 p. AD 12 231
UNCLASSIFIED

The effect of proprioceptive stimulation on learning a visuo-motor skill was studied by altering the method of response from free-moving

isotonic to pressure-control isometric conditions. A total of 95 normal subjects and one tabetic patient were required to control the output of a velocity-control servomechanism by tracking a two-dimensional spot on a cathode-ray oscilloscope screen. Greater accuracy and more learning resulted with the pressure-control method: transfer effects also favored this method. The results implied that the skilled movements were continuously regulated by kinesthetic data which were generated by the moving limb and continuously fed back to the higher motor centers. An hypothesis of rate control is presented in which the extent of movement is estimated by integrating a known rate of movement over a known period of time. (AD abstract)

1449

Gibson, E. J. 1953
A SURVEY OF RESEARCH ON IMPROVEMENT IN PERCEPTUAL JUDGMENTS AS A FUNCTION OF CONTROLLED PRACTICE AND TRAINING. — Cornell Univ., Ithaca, N. Y. (Contract AF 33(038)-22373); issued by Human Resources Research Center. Perceptual and Motor Skills Research Labs., Lackland Air Force Base, Tex. Research Bulletin no. 53-45, Nov. 1953. iii+66 p. (Project no. 509-019-0003). AD 24 653
UNCLASSIFIED

Studies concerning the effects of training on perceptual judgments are reviewed and grouped according to the areas affected: acuity; upper and lower limens; color discrimination; perception under conditions of impoverished stimulation; relative discrimination; and absolute judgment. Hypotheses concerning perceptual learning are discussed. (AD abstract)

A bibliography of 206 references is attached.

1450

Gibson J. J., 1952
and W. Carel
DOES MOTION PERSPECTIVE INDEPENDENTLY PRODUCE THE IMPRESSION OF A RECEDING SURFACE? — Jour. Exper. Psychol., 44 (1): 16-18. 1952. DLC (BF1.J6, v. 44)

To a group of 7 subjects familiar with the object of this experiment, and to another group of 10 subjects not familiar, a device was presented in a darkened room which gave the impression to the viewer that he was seeing a bank of separate lights. This device consisted of a six-foot black, movable disc, which had painted upon its surface radiating, luminous lines of broken segments. An opaque screen was placed in front of the disc; this screen had cut in its surface a group of parallel, horizontal slits in the shape of a triangle with its base down. The luminous segments on the disc appeared as separate spots when viewed through the slits. The motionless bank of spots was presented to the dark-adapted subjects, and requests of perception were made. Then, the wheel was set in motion, and a second request of perception was made. All the subjects perceived the light spots when they were motionless as in a plane perpendicular to the eye. No sensation of slant, recession, or increasing distance was reported. When the lights were in motion, the sophisticated group of 7 subjects could feel a sensation of distance with respect to the upper lights. Some even reported feeling motion in a direction opposite to the motion of the lights. Of the 10 naive subjects, 6 percieved no depth sensations at all, and 3 reported a receding plane of distance, while 1 was equivocal.

1451

Gibson, J. J., 1952a
and J. S. Robinson
THE EFFECTIVENESS OF AN ABRUPT CHANGE IN TEXTURE-DENSITY AS A STIMULUS FOR THE IMPRESSION OF DEPTH-AT-AN-EDGE. — Cornell Univ., Ithaca, N. Y. (Contract AF 33(038)-22373); issued by Human Resources Research Center. [Perceptual and Motor Skills Research Lab.], Lackland Air Force Base, Tex. Research Note no. P&MS 52-2, Feb. 1952. 5 p. (Project no. 509-019-0002).
AD 121 409 UNCLASSIFIED

Two surfaces having the same physical texture will look different when in superposition at different distances from the eye, due to the fact that the more distant surface will yield a retinal image with a denser texture than the closer one. A study is presented directed toward discovering whether this difference in the texture-density of the retinal image is a stimulus correlate for the phenomenon of "depth-at-an-edge". The subject viewed monocularly, through a tube, two pieces of bookbinder's paper covered with an irregular dotted design and mounted so that they could be shifted independently toward and away from the eye. A shutter shielded the surfaces from the subject between trials. Eleven male subjects were divided into two groups. The subjects in Group I were instructed to report whether or not they had impressions of depth, while those in Group II simply were requested to describe what they had seen, without special reference to depth. Only the subjects in Group I reported depth, thus proving that a change in texture density in monocular observation is not a sufficient stimulus for depth perception. When the same experiment was repeated using both eyes all observers saw one surface clearly behind the other.

1452

Gibson, J. J., 1952b
and D. Waddell
HOMOGENEOUS RETINAL STIMULATION AND VISUAL PERCEPTION. — Amer. Jour. Psychol., 65 (2): 263-270. 1952. DLC (BF1.A5, v. 65)

The extent to which homogenous and differentiated retinal images determine visual perception is investigated. Naive test subjects were led blindfolded into a room not previously known to them, and goggles consisting of two hemispheres of a translucent diffusing substance were fitted over their closed eyes. Seated facing a light gray strongly illuminated wall, they were asked to open their eyes and describe what they saw in terms of spatial characteristics. As expected, the subjects were unable to decide whether they perceived a bidimensional or tridimensional image, which leads

to the conclusion that a homogeneous field of color is indeterminate with respect to depth. Some answers indicated that qualities characterizing the visual world (surfaces, edges, distances, etc.) were perceived; however, they are believed to be determined not by peripheral stimulation but by central processes. It is concluded that the solution to the problem of depth perception is not to be found in color-sensations--neither in the hypothesis that they possess intrinsic depth nor in the hypothesis that they are originally depthless and acquire depth as a result of learning. The solution may be found in the study of differentiated retinal images, i.e. those with gradients and steps of luminous intensity.

1453

Gierke, H. E. von, 1953
H. Davis, D. H. Eldredge, and J. D. Hardy
AURAL PAIN PRODUCED BY SOUND. — In: Benox report: an exploratory study of the biological effects of noise, p. 29-36. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

The threshold for aural pain produced by sound was measured in the frequency range from 0 to 2000 c.p.s. In the auditory range and pain threshold was roughly 140 db. Below 15 c.p.s. it increased to 179 db. for "static" pressure. Aural pain most probably arises from a region of the middle ear which includes the drum membrane and the ossicles and not from the organ of Corti. The threshold of aural pain does not serve as a danger signal for injury to the organ of Corti or for hearing loss. Measurements of aural pain threshold in the laboratory are entirely comparable to those made in the field. There was no significant difference in the measurements of pain threshold made around the jet engine and those made in the anechoic chamber. These thresholds are also almost identical with earlier measurements for speech and for tones heard through earphones. The thermal pain threshold is raised by the presence of intense noise. The production of tissue damage by heat is not so readily detected. Therefore when pain is perceived from any source in an intense sound field, the limit of physiological safety has presumably already been surpassed and continued exposure to such a stimulus is dangerous. (Authors' summary)

1454

Gierke, H. E. von, 1953a
and D. R. Warren
PROTECTION OF THE EAR FROM NOISE: LIMITING FACTORS. — In: Benox report: an exploratory study of the biological effects of noise, p. 47-60. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

Measured attenuation provided by earplugs agrees satisfactorily with values predicted from theoretical considerations. At frequencies below 1000 c.p.s. the elasticity of the skin lining the ear canal determines the practical limit for the attenuation to be obtained with insert type earplugs. Above 1000 c.p.s. the attenuation actually provided by earplugs reaches the limit set by the fact that sound reaches the inner ear not only by air-conduction but also by bone-conduction. These considerations show that little improvement can be expected from changes of the material, the shape, or the fit of insert type earplugs. A complete analysis of this problem requires a more thorough investigation of the bone-conduction threshold in a free, random sound field, especially for frequencies above 1000 c.p.s. It was also shown that the limits for the protection by ideal ear muffs are likewise set by the bone-conduction threshold. Usually less protection is obtained with ear muffs since practicable seals are imperfect. Approximate values are also given for differences in threshold when the acoustic stimulus is to the head or to other areas of the body. (Authors' summary)

1455

Gierke, H. E. von 1953b
PHYSICAL CHARACTERISTICS OF AIRCRAFT NOISE SOURCES. — Jour. Acoust. Soc. America, 25 (3): 367-378. 1953. DLC (QC221.A4, v. 25)

Available basic characteristics of different aircraft noise sources under the condition of zero forward speed are summarized: total acoustic power; acoustic mechanical efficiency; directivity and frequency characteristics are given for the rotation and vortex noise of propellers, for the exhaust noise of reciprocating engines, and for different types of jet engines. The physical mechanisms underlying the different noise sources are discussed and the influence of changes in the parameters such as tip speed or pitch of the propeller and diameter or velocity of the gas jet are shown. In cases where measurements on the actual propulsion systems are incomplete, the basic physical conclusions are drawn from experiments on model aircrews and small air jets. The changes in the characteristics of the noise generators during flight are discussed briefly. (Author's summary)

1456

Girling, F., 1953
and C. Maheux
PERIPHERAL CIRCULATION AND SIMULATED ALTITUDE. II. — Jour. Aviation Med., 24 (5): 446-448. 1953. DLC (TL555.A1A4, v. 24)

The response of the peripheral blood flow to lowered barometric pressure was studied in heparinized, anesthetized (urethane) rabbits. In the first series, animals were allowed to breathe air at ground level, next to breathe 100% oxygen for 30-60 minutes, then to return to room air. The resistances to flow were computed. In another series, the animals were preoxygenated (breathing 100% oxygen for 4 hours) and then exposed to simulated altitudes of 10,000, 20,000, and 30,000 feet. In the first series there was no significant difference between the vascular resistance of animals breathing air or breathing 100% oxygen (1.36 and 1.39, respectively). In the second series the results indicated that the mean relative resistance

increases with the altitude. The differences between the means from ground to 10,000 to 20,000 to 30,000 feet are highly significant. The authors discuss the results with regard to the dynamics of blood vessels. It is concluded that there is a vasomotor response to reduced barometric pressure, and that this response takes the form of an increased peripheral resistance to the flow of blood.

1457

Glatt, R. 1953
[ELECTROCARDIOGRAM OF PILOTS IN FLIGHT TRANSMITTED BY RADIO] L'électrocardiogramme des pilotes en vol transmis par radio. — Cardiologia (Basel), 22 (4): 238-246. 1953. In French. DNLM

A method is described of transmitting electrocardiograms of pilots in flight by radio. The radio transmission is carried out by means of a frequency-modulated device, connected to the standard aircraft transmitter. The device enables the electrocardiogram to be recorded without distortion or statics. Several recordings of electrocardiograms, radio-transmitted from a flying De Havilland Vampire airplane, have been reproduced and are discussed. Further applications are considered. (Author's abstract, modified)

1458

Glees, M., 1952
K. H. Rochels, and W. Wüstenberg
[CAN LIGHT AND COLOR PERCEPTION OF A HEALTHY SUBJECT BE INFLUENCED BY VITAMINS AND SIMILAR SUBSTANCES?] Lässt sich der Licht- und Farbensinn des gesunden Menschen durch Vitamine und ähnliche Stoffe beinflussen? — Albrecht von Graefes Archiv der Ophthalmologie (Berlin), 153: 188-201. 1952. In German. DNLM

Dark adaptation and color sensitivity were studied under various conditions in healthy subjects, trained in the methods of optical physiology, before and after administration of helenin (600 mg. daily). No noticeable changes could be observed at any time; nor did the tests with vitamin A and vitamin C reveal any changes in normal dark adaptation. The possibility of influencing normal retinal processes by these means must therefore be rejected, especially since there is no physiological basis for such a procedure. Opposed views, expressed by other authors, are discussed in detail.

1459

Gleser, G. [C.], 1952
and G. [A.] Ulett
THE SASLOW SCREENING TEST AS A MEASURE OF ANXIETY-PRONENESS. — Jour. Clin. Psychol., 8 (3): 279-283. 1952. DLC (RC321.J74, v. 8)

The Saslow Screening Test was used as a scoring procedure in the measurement of anxiety-proneness and maladjustment in 151 male normal subjects drawn from Air Force reserves, Army personnel, etc., and 40 neuropsychiatric patients. First a psychologist administered a battery of tests to each individual, then a psychiatrist interviewed the subject. In the Saslow test proper, the subject reported his reaction to two types of social situations which may cause inner conflict leading to various somatic symptoms. The best evaluation of the Saslow test results from the analysis of the total group. The test has a good correlation with the ratings of both the psychiatrist and the psychologist. It agrees best with the Taylor Anxiety Scale among the psychological tests applied. Results show a greater discrepancy with regard to the clinical evaluation of maladjustment. The Saslow test is not dependent upon vocabulary level and as such is easily applicable to subjects of different educational levels.

1460

Glover, H. C. 1953
APPLICATION AND DESCRIPTION OF A NEW VERTEX FOCOMETER. — Amer. Jour. Optometry, 30 (3): 130-134. 1953. DAFM

The vertex focometer was developed by the American Optical Co. to test the optical quality of acrylin plastic visors used in high-altitude and high-speed flight. All visors have inherent optical defects either in refractive power or in prismatic effect, or in both; further, the electric wiring used for defrosting and defogging the visor impairs vision. — The focometer is portable and is mounted to a stand to provide height adjustment. A graduated power wheel on the focometer is calibrated to measure small variations of refractive power in hundredth of a diopter (within a range of -0.30 to + 0.30 diopter) and prismatic power in tenth of a prismatic diopter (from zero to 0.5 prism diopter).

1461

Gofton, J. P., 1953
and S. D. McGrath
STUDIES OF ADRENOCORTICAL FUNCTION IN LONG-DISTANCE FLIERS: A PRELIMINARY REPORT. — Jour. Aviation Med., 24 (2): 107-112. 1953. DLC (TL555.A1A4, v. 24)

Studies of eosinophil blood cells were made on six subjects, the crew of an R.C.A.F. "North Star" Transport plane on a routine flight in the Tokyo air lift. No consistent relationship could be shown between the drop in the eosinophil count and the length of flight, nor were there consistently lower levels of eosinophils on flying days. The crew member who consistently showed the lowest eosinophil count seemed to be most subject to fatigue. Changes in time zones in this East to West route introduced complicating factors when comparing the counts with the diurnal curve on the day of non-flying duties at the home base. (Authors' summary)

1462

Gofton, J. P., 1953a
B. F. Graham, S. D. McGrath, and R. A. Cleghorn
EVALUATION OF CHANGES IN EOSINOPHIL LEVELS IN STUDIES OF ADRENOCORTICAL FUNCTION AND STRESS. — Jour. Aviation Med., 24 (2): 123-126. 1953. DLC (TL555.A1A4, v. 24)

Stimulation of the adrenal cortex results in eosinopenia; administration of adrenal steroids produces the same results. This relationship has led to the expression, "adrenal cortical reserve", as an index of adreno-cortical activity. In any study purporting to disclose a relationship between stress and eosinopenia, one should know details of the experimental technique, including the number of chambers counted, time of day in which the study was done, and control counts on non-stressful days. In addition to external stress on the human subject, account must be taken of the subjective state of the individual at the time of application of the external stress, for this determines the stressfulness to him of any situation.

1463

Gogel, W. C., 1953
J. P. Tammaro, D. A. Nordling, and F. L. Nungesser
THE PERCEPTION OF THE RELATIVE DEPTH POSITION OF OBJECTS AS A FUNCTION OF OTHER OBJECTS IN THE FIELD OF VIEW. — Army Medical Research Lab., Fort Knox, Ky. Report no. 107, Jan. 6, 1953. ii+17 p. (AMRL Project no. 6-95-20-001). AD 13 295
UNCLASSIFIED

A difference between the apparent and physical depth positions of laterally separated objects in the field of view was produced by using a series of similar objects of different sizes. It was found that the adjustment of a dissimilar object (a binocular test object) to the apparent depth position of one of these objects (a binocular reference object) depended upon the lateral position of the test object above the series of binocular objects. The hypothesis was made that the binocular depth illusion would least disturb the apparent position of the test object with respect to that object whose distance from the test object subtended the smallest visual angle. It is suggested that the binocular disparity between a test object and a frontally adjacent object is functionally more important than that between a test object and a frontally less adjacent object, regardless of which object is designated as the reference object. It is recommended that the relative functional importance of the various disparities in the field of view for particular situations continue to be investigated with the objective of specifying the conditions which will permit the most accurate and reliable prediction of the depth aspects of the physical world from those of the visual world. (Authors' abstract)

1464

Gogel, W. C., 1953a
G. S. Harker, J. P. Tammaro, K. Inaba, and R. L. Brune
THE EFFECTIVENESS OF SIZE CUES TO RELATIVE DEPTH AS A FUNCTION OF THE LATERAL SEPARATION OF OBJECTS. — Army Medical Research Lab., Fort Knox, Ky. Report no. 125, Oct. 31, 1953. iii+17 p. (AMRL Project no. 6-95-20-001). AD 28 863 UNCLASSIFIED

Two similar, differently sized playing cards, which were located at the same distance from the subjects, were laterally separated by two different amounts. It was found that the apparent depth difference between the two cards, as a consequence of their size difference, was greater with the greater lateral separation. This occurred when the two cards were viewed binocularly and also when one of the cards was viewed binocularly and the other monocularly. (Authors' summary)

1465

Gogel, W. C., 1953b
and G. S. Harker
THE EFFECTIVENESS OF SIZE CUES TO RELATIVE DEPTH AS A FUNCTION OF THE LATERAL SEPARATION OF OBJECTS [Abstract]. — Amer. Psychologist, 8 (8): 356. 1953. DLC (BF1.A55, v. 8)

A condensation of the report, Gogel, W. C., 1953a.

1466

Goldstein, M., 1953
and C. H. Rittenhouse
THE EFFECTS OF PRACTICE WITH TRIGGERING OMITTED ON PERFORMANCE OF THE TOTAL PEDESTAL SIGHT GUNNERY TASK. — Human Resources Research Center. Armament Systems Training Research Lab., Lowry Air Force Base, Colo. Technical Report 53-9, May 1953. iii+12 p. (Project no. 512-024-0001). AD 18 956
UNCLASSIFIED

This study is concerned with the omission of triggering during early stages of practice on the Pedestal Sight Manipulation Test and the effect of such omission on subsequent performance of the complete task, i.e., including the triggering component. There was no clear indication, based on theoretical implications, that omission of the triggering task during early training would improve, or impair, final performance of the task. The results of the study indicated, in general, that airmen given five periods of practice without triggering and five periods of practice with triggering included performed at about the same level at the end of nine days as did other airmen whose training included triggering during practice throughout all of the nine days. Insertion of two periods of no-triggering practice into a series of periods which included triggering produced a somewhat disruptive effect and tended to impair over-all performance slightly. However, irrespective of the type of training employed, all airmen in the study improved significantly over the training series" (p. ii).

1467

Goorney, A. B. 1953
UNIVERSAL ORONASAL PRESSURE OXYGEN MASK. — Lancet (London), 1953, 1 (9): 422. Feb. 28, 1953. DLC (R31.L3, 1953, v. 1)

The efficiency of an oxygen mask design developed at the R. A. F. Institute of Aviation Medicine to be used at high altitude flight is discussed. In designing the mask, consideration was given to

such factors as comfort, continued sealing under aerobatic conditions and during facial contortions and speech, minimum obscuration of vision, ease of adjustment, and adjustment to all shapes of faces likely to be met with. The following are the characteristics of this universally fitting mask: (1) the shaping of the mask on the nasal labial folds eliminates the inclusion of the lower jaw, thus reducing the dead space in the mask to an average of 60 cc.; (2) the incorporation of a malleable though firm section over the bridge of the nose thus allowing the mask to be moulded to the shape of any nose; (3) the reflected edge rounded into a thin soft flap and projecting internally into the mask helps to seal the mask by ballooning against the skin as internal pressure is increased.

1468

Gordon, D. A., 1953
H. J. Zagorski, and J. Zeidner
A COMPARISON OF ORTHO-RATER AND WALL CHART VISUAL ACUITY MEASUREMENTS. — Adjutant General's Office (Army). Personnel Research Branch, Washington, D. C. PRB Research Note no. 10, Feb. 1953. 11 p. (Army Project no. 29535100). AD 11 430 UNCLASSIFIED

Measurements of the visual acuity of 117 soldiers on letter and modified-Landolt-ring targets were compared for the Bausch and Lomb Ortho-Rater (OR) and the wall-chart methods of testing. Although the difficulty levels were about the same, the OR method demonstrated (1) significantly greater reliability; (2) better control of target brightness and distance; (3) less space required for testing; (4) greater convenience of target-changing; and (5) adaptability for the measurement of other visual functions. The high correlation (r = 0.98) of the two methods revealed that the same visual abilities were measured by both tests. (AD abstract)

1469

Gordon, M. A. 1952c
CONTRIBUTION OF THREE PARTS OF DIAL AND TABLE READING BP622A-621A TO MULTIPLE VALIDITY OF THE AIRMAN CLASSIFICATION BATTERY. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-30, July 1952. 15 p. (Project no. 503-001-0001). ATI 161673 UNCLASSIFIED

Dial and Table Reading Test 622A-621A has shown relatively high predictive value for many diverse technical specialties. This study is concerned with the analysis of the contributions of the part scores to multiple validity. The purpose of this multiple correlation analysis is to see whether the three parts of the test (Dial Reading, and Table Reading I and II) could be weighted individually into different aptitude indexes. The following intercorrelations were found: (1) high correlations of Dial Reading with Arithmetic Reasoning and Numerical Operations; (2) moderately high correlations between Table Reading I and II and the two numerical tests; (3) relatively high correlation between Table Reading II and Speed of Identification; and (4) similarity and small range of correlations of all three parts with remaining tests. It is concluded that the parts of the test could be substituted for the total test with little or no loss in validity of aptitude index. The weighting of different parts in different aptitude indexes would probably reduce the present overlap among the indexes. (From p. 1, and author's conclusions)

1470

Gordon, N. B., 1953
A. Goldman, and C. P. Seitz
HUMAN ENGINEERING STUDY OF NAVAL AIR RESERVE TRAINING. PHASE I: SURVEY OF PROBLEMS. — International Public Opinion Research Corp., New York (Contract Nonr-895(00)); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Report no. SDC 895-00-1, March 9, 1953. viii+42+3 p. AD 22 812 UNCLASSIFIED

An analysis was made of 11 problem areas which the project staff deemed to be of major importance in the Naval Air Reserve training program. The problem areas covered are: basic objectives, instructors, trainee groupings, human relations, syllabi, communications, training aids, command liaison, recruitment and placement of reservists, plant facilities, and geographic limitations. Each area is followed by action recommendations specified in terms of goals, steps for implementation, and anticipated end results. (AD abstract)

1471

Gorlin, R., 1952
and B. M. Lewis
EFFECTS OF GRADED HYPOXEMIA ON THE PULMONARY CIRCULATION OF THE DOG: SEVERE HYPOXEMIA. — Federation Proceedings, 11 (1I): 57. 1952. DLC (QH301.F37, v. 11)

Eleven dogs, anesthetized with morphine-chloralose-urethane, were subjected to breathing mixtures containing from 2.5-10% oxygen on 17 occasions. Arterial oxygen saturation varied from 8 to 55% depending on inspired oxygen percentage. Mean pulmonary artery (PA) and left atrial (LA) pressures were measured with indwelling catheters via jugular vein and femoral artery respectively. Integrated cardiac outputs (CO) were measured by the Fick principle, utilizing Benedict-Roth method for O_2 consumption. Pulmonary vascular resistance (PVR) was calculated:

$$PVR = \frac{PA - LA}{CO} \times 1332 \text{ dynes sec. cm.}^{-5}$$

Observations were made at intervals varying from 3 1/2 minutes to 8 hours after induction of hypoxia. When arterial oxygen saturation was above 15% and less than 55%, CO increased from 40 to 300% above control values. Oxygen consumption remained unchanged. PA pressure rose moderately; LA pressure remained the same or decreased. PVR remained unchanged or actually decreased, regardless of the time duration of hypoxia. When arterial saturation was less than 15%, LA pressure rose. In 3 observations CO increased and in 6 remained the same or decreased. PA pressure increased uniformly. No changes in PVR were observed. (From the authors' abstract)

1472

Gottsdanker, R. M. 1952
PREDICTION-MOTION WITH AND WITHOUT VISION. — Amer. Jour. Psychol., 65 (4): 533-543. 1952. DLC (BF1.A5, v. 65)

A group of college students were given the task of tracking a moving target beyond the point of its disappearance from view. This operation of continuation was effected both with the eyes open and closed. Non-visual continuation proved to be less accurate than visual continuation although the mechanism of prediction was operating under both conditions. Acceleration of the target was not followed up in the tracking. Only one fourth of the group reported awareness of acceleration without, however, improving their performance. Kinesthetic, and cutaneous, in addition to visual, cues were employed.

1473

Gottsdanker, R. M. 1952a
THE ACCURACY OF PREDICTION MOTION. — Jour. Exper. Psychol., 43 (1): 26-36. 1952. DLC (BF1.J6, v. 43)

A group of 20 students were given the task of tracking curved lines drawn on a moving sheet of paper. The paper was covered with a mask, a narrow slit of which was left open. When the line disappeared underneath the mask, the test subjects were required to follow the expected course with a pencil. In this operation, 11% of error in motion prediction was encountered. Also tested was the ability of predicting acceleration. The fact that increasing acceleration was predicted with proportionally greater accuracy than decreasing acceleration gave rise to the assumption that a rate-reducing mechanism is at work in target tracking. Individual differences were observed. Repetition of identical acceleration patterns did increase learning. The results are in accord with the observation that gunners are less certain in their aim in the case of approaching than in the case of receding targets.

1474

Gougerot, L. 1953
[THE WEBER-FECHNER LAW AND VARIATIONS OF APPARENT GRAVITY]. Loi de Weber-Fechner et variations de la pesanter apparente. — Méd. aéronaut. (Paris), 8 (2): 119-125. 1953. In French. DLC (TL555.M394, v. 8)

It has been said that the sensations experienced during accelerated descent are more intense and more disagreeable than those experienced during ascent. In an attempt to explain this phenomenon observed by several authors, the Weber-Fechner law was applied to the stimulus of gravity on the sensory receptors of the ear. The author feels that the phenomenon may not have been completely described in the mathematical treatment by H. Haber, and S. J. Gerathewohl. The psychological factors of "instinctive" fear must contribute also to the sensations one experiences when descending rapidly.

1475

Graham, N. E. 1952
MANUAL TRACKING ON A HORIZONTAL SCALE AND IN THE FOUR QUADRANTS OF A CIRCULAR SCALE. — British Jour. Psychol. (Cambridge, Gt. Brit.) (General Section), 43(1): 70-77. 1952. DNLM
Reprint issued also as: Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 783, [1952]. TIP U71618 UNCLASSIFIED

Speed and accuracy of manual tracking on a horizontal scale was compared with values obtained in tracking two targets on circular scale, one in the upper and the other in the lower quadrant of a circle. The tracking was done by turning a circular control knob. No difference in performance was observed between trackings in the upper quadrant of the circular scale and those on the horizontal scale. Errors increased in the lower quadrant where the direction of movement is reversed. It is concluded that clockwise rotation of a control knob located vertically beneath the display is generally associated with a pointer movement from left to right, along a linear scale as well as an arc.

1476

Grandpierre, R., 1952k
C. Frank, and E. Violette
[CHANGES IN THE PRESSURE OF THE CEREBROSPINAL FLUID DURING HYPOCAPNIC ANOXEMIA AND REOXYGENATION] L'évolution de la pression du liquide céphalorachidien au cours de l'anoxémie hypocapnique et de la réoxygenation. — Comptes rendus de la Société de biologie (Paris), 146 (15-16): 1246-1247. 1952. In French. DLC (QP1.S7, v. 146)

A study on pressure changes in the cerebrospinal fluid of dogs during anoxia is presented with special emphasis on the influence of hypocapnia and reoxygenation. Great precision was obtained by recording the cerebrospinal, arterial, and venous pressures by means of an inductance manometer, thus avoiding frictional loss. The pressure of the cerebrospinal fluid increases progressively during the period of anoxemic hyperventilation and pre-apnea respiratory slackening. If anoxemia is allowed to continue until the death of the animal, the pressure of the cerebrospinal fluid stabilizes at the moment of respiratory cessation for a varying length of time, then decreases with the arterial pressure, while venous pressure increases. At the moment of cardiac failure, the cerebrospinal pressure is still equal to several centimeters of water; then decreases very slowly to zero, the same as the venous pressure. Inhalation of gaseous anoxemic mixtures always elicits changes in the cerebrospinal pressure which roughly follow the changes of arterial pressure, not exceeding the maximum which was reached at the start of apnea. These changes are not absolutely parallel to either those in the arterial or venous pressure, but probably depending upon both of these.

1477

Grandpierre, R., 1953
P. Grognot, and F. Violette
SOME PARTICULAR EFFECTS OF EXPLOSIVE DECOMPRESSIONS ON ANIMALS. — Jour. Aviation Med., 24 (1): 20-22. 1953.
DLC (TL555.A1A4, v. 24)

Groups of unanesthetized and anesthetized dogs or cats were subjected to explosive decompression from 9,000 to 15,000 meters simulated altitude in 0.019 second. The unanesthetized animals, as a rule, withstood this procedure well. Autopsy of animals killed immediately after the experiment showed sometimes bloody pulmonary effusions. Anesthetized dogs regularly developed bleeding from the ears. After decompression, a brief apnea was observed, followed by resumption of breathing. Changes in the electrocardiogram and the arterial and intracranial pressures were observed; both these systems showed a marked temporary pressure increase at the moment of decompression. The role of reflexes in the circulatory and respiratory fluctuations is discussed.

1478

Grant, W. C. 1952
INFLUENCE OF ANOXIA OF A LACTATING RAT ON THE BLOOD OF NORMAL BABY RATS. — Amer. Jour. Physiol., 171 (3): 728-729. 1952.
DLC (QP1.A5, v. 171)

Same as the report, Grant, W. C., 1953a.

1479

Grant, W. C., 1953
and W. S. Root
THE POLYCYTHEMIC RESPONSE OF SYMPATHECTOMIZED DOGS TO DISCONTINUOUS HYPOXIA. — May 1953. iii+3 p. Columbia Univ. College of Physicians and Surgeons, New York (Contract AF 33(038)25899); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-2301-0005, Report no. 1). AD 19 651
PB 110938

Completely sympathectomized and unoperated control dogs were exposed discontinuously to hypoxic hypoxia for 27 to 73 days. No consistent difference was found in the degree of polycythemia attained. It is concluded that the peripheral sympathetic nervous system of the dog is not essential for the polycythemic response to hypoxic hypoxia. (Authors' summary)

1480

Grant, W. C. 1953a
THE INFLUENCE OF HYPOXIA OF LACTATING RATS AND MICE ON THE BLOOD OF THEIR NORMAL OFFSPRING. — August 1953. iii+4 p. Columbia Univ. College of Physicians and Surgeons, New York (Contract AF 33(038)25899); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-2301-0005, Report no. 3). AD 19 611 PB 112366

Lactating rats and mice 3 to 4 days post partum were discontinuously exposed daily to an ambient pressure of 400 to 300 mm. Hg for six hours while their litters remained at sea level pressure. At the same time, control rats and mice were separated from their litters but were kept at sea level pressure. The blood of baby rats was sampled when they were 10 to 25 days of age. The hematocrit, erythrocyte count, and oxygen capacity values of those nursed by hypoxic mothers were found to be greater than of those nursed by the normal mothers. The total hemoglobin of baby mice nursed by hypoxic mothers generally exceeded that obtained from mice nursed by normal mothers. The evidence indicates that a substance is present in the milk of hypoxic rats and mice which produces an increased hemoglobin content in the nursing young. (Author's summary)

1481

Grant, W. C., 1953b
and W. S. Root
POLYCYTHEMIC RESPONSE OF SYMPATHECTOMIZED DOGS TO DISCONTINUOUS ANOXIA. — Amer. Jour. Physiol., 173 (2): 321-323. 1953. DLC (QP1.A5, v. 173)

Same as the report, Grant, W. C., 1953.

1482

Graybiel, A., 1952e
J. I. Niven, and T. E. Walsh
THE DIFFERENTIATION BETWEEN SYMPTOMS REFERABLE TO THE OTOLITH ORGANS AND SEMICIRCULAR CANALS IN PATIENTS WITH NON-SUPPURATIVE LABYRINTHITIS. — Laryngoscope, 62 (9): 924-933. 1952. DNLM

Same as the report, Graybiel, A., 1952c.

1483

Graybiel, A., 1953
J. M. Packard, and J. S. Graettinger
A TWELVE YEAR FOLLOW-UP STUDY OF 1056 U. S. NAVAL FLYERS. — Military Surgeon, 112 (3): 328-332. 1953. DLC (RD1.A7, v. 112)

The over-all medical history is described of a sample group of 1056 naval flyers, evaluating results presented in the report, Packard, J. M. 1952a. It is shown that the wartime death rate of the group corresponds to that of all naval aviators. The wartime death rate of the aviators surpasses seven times that of non-flying officers. In terms of combat deaths alone, however, the death rate of the group is double that of all naval aviators, while the reverse proportion holds true for the period following World War II. This is explained by disproportions in age, the group having been younger than average during World War II, but older in the postwar period and largely confined to administrative duties. Only 27 of the deaths among the entire group were unrelated to aviation. More than one half of these had occurred in combat, and four were caused by non-aviation accidents. The remaining 7 men died of disease, and only one of these of an infectious disease--testimony to the high standards of selection and to the

effective prophylaxis and good medical care. Eighty-one percent of those still living have been reexamined since 1951. Of this group, 419 showed none or minor evidence of diseases or defects; 157 were found to be overweight by 11% or more; 87 showed abnormalities related to the cardio-vascular system; and 15 had been afflicted by a variety of serious diseases.

1484

Green, B. F., 1953
W. J. McGill, and H. M. Jenkins
THE TIME REQUIRED TO SEARCH FOR NUMBERS ON LARGE VISUAL DISPLAYS. — Massachusetts Inst. of Technology. Lincoln Lab., Cambridge. Technical Report no. 36, Aug. 18, 1953. ii+15 p. (Contract AF 19(122)-458).
AD 21 109 UNCLASSIFIED

Several experiments have been conducted in order to determine the amount of time that is lost in searching for numbers on typical visual displays. For legible numbers on a large visual display, the most important variable is the number of alternative numbers that must be scanned. The search time is shorter for large numbers than for small numbers, unless there are so many numbers that the display becomes crowded. If the numbers on the display are all in an upright orientation, the search time is shorter than if the numbers are oriented at random on the display. However, if the numbers are all oriented in the same way and this orientation is not upright with respect to the observer, the search time depends on the particular orientation. Numbers at some positions in the patterns of numbers are harder to find than others, but the effect of location is very small. If the numbers are clearly legible, typical background clutter has no effect on search time. When color of the number to be searched for is specified in advance, the presence of numbers of a clearly different color does not affect the search time. Some individuals are faster searchers than others, but the differences are relatively small. (From the authors' abstract)

1485

Green, R. F., 1952
B. G. Andreas, and S. D. S. Spragg
TRANSFER OF SKILL BETWEEN COMPENSATORY AND FOLLOWING TRACKING TASKS [Abstract]. — Amer. Psychologist, 7 (7): 393-394. 1952. DLC (BF1.A55, v. 7)

The amount of transfer effect between compensatory tracking and following tracking was determined on four groups of subjects. Groups I and III were given 8 one-minute trials on a following tracking task (modified SAM Two-Hand Coordination Task) with the display—control movement relationships such as to provide optimal or "natural" relationships. They were then given 8 one-minute trials on a compensatory tracking task (modified SAM Pursuit Task), Group I with the display—control movement relationships and Group III with the opposite ("unnatural") display—control relationships. Groups II and IV received 8 one-minute trials on the compensatory tracking task, Group II with the display—control relationships which had been found previously to be optimal or "natural" in following tracking, and Group IV with the opposite ("unnatural") relationships. Both groups were then given 8 trials on the following tracking task, using the optimal or "natural" display—control movement relationships. The principal measure of performance analyzed was time on target. The results indicate a zero-order net transfer effect from compensatory to following tracking. There was significant positive transfer effect from following tracking to compensatory tracking only for Group III (for whom the display—control movement relationships in compensatory tracking were opposite to those previously found optimal for following tracking).

1486

Green, R. F., 1953
B. G. Andreas, E. B. Norris, and S. D. S. Spragg
THE EFFECTS OF CONTINUITY IN DISPLAY AND CONTROL MOVEMENT RELATIONSHIPS ON TWO-HAND TRACKING PERFORMANCE. — Univ. of Rochester, N. Y. (Contract N6onr-241, Task Order 6); issued by Special Devices Center, Port Washington, N. Y. Technical Report no. SPECDEVCEN 241-6-12, Oct. 26, 1953. 2+7 p.
AD 119 859 UNCLASSIFIED

Controls on radar and gunnery equipment may be located so that the operator cannot see a direct relationship between the way he moves the control crank and the direction of actual movement. Accuracy in tracking has been shown to be greatly affected by these relationships. This research is designed to discover the general principle to be used in placing controls that will permit the greatest accuracy in tracking. From the results of the experiments the following conclusions are drawn: (1) Controls should be located so that the axes of the controls and of the display are parallel and so that the direction of movement of the controls is in the same direction as the motion of the display. (2) The actual location of the control, if easy to operate, is not an important factor in performance if the above conditions are observed. (Preliminary statement, modified)

1487

Green, R. F. 1953a
THE TRANSFER OF TRACKING SKILL AS A FUNCTION OF TASK DIFFICULTY (TARGET SIZE). — Univ. of Rochester. Dept. of Psychology, N. Y. (Contract N6onr-241, Task Order 6); issued by Office of Naval Research. Special Devices Center, Port Washington, N. Y. Report no. SPECDEVCEN 241-6-13, Dec. 16, 1953. 1+9 p. AD 109 345 UNCLASSIFIED

The purpose of this study was to discover whether initial training on a target of one size was more effective than initial training on targets of a different size. For a wide range of target sizes (1/8" - 7/8" in this study) practice with a target of one size has the same training effect as practice with larger or smaller targets. Within this range of targets, a skill learned with one size of target transfers completely to a new task using a different size of target. A large target should be used in training men how to track a target. It is easier to track a large target, and learning will transfer completely to a more difficult task. One should

also consider the factors of target speed and angle as additional determinants of task difficulty. (Author's results and recommendations)

1488

Green, R. F., 1953b
B. G. Andreas, and S. D. S. Spragg
ACCURACY OF BISECTION OF ANGULAR EXTENTS WITH KNOB CONTROLS AS FUNCTIONS OF DIRECTION OF FINAL MOVEMENT AND NUMBER OF SETTINGS [Abstract]. — Amer. Psychologist, 8 (8): 357-358. 1953.
DLC (BF1.A55, v. 8)

The accuracy of bisecting angular extents by means of a control knob as a function of the direction of the final setting movement, and the effect on accuracy of repeated bisections, were investigated in 96 right-handed military men in basic training. Each subject was given 42 trials. The first 20 settings of each subject included 10 in which final movement was to the right and 10 to the left, all at 80°. These two conditions were alternated from subject to subject. There followed immediately 8 settings on each of the following conditions: final movement right, 40°; left, 40°; right, 120°; left, 120°. All 24 permutations of these four conditions were used. The importance of the direction of the final setting movement was found to be dependent both upon the angular extent being bisected and upon the number of times the setting had been repeated. The subject overshot the setting when the final setting movement was either to the right or to the left but they overshot less when final movement was to the left. The effect of repeated trials varied with the angular extent being bisected. There was a marked tendency for overshooting to increase with repetition of bisections of 40° or 80° but not of 120°. It is concluded that operators of equipment requiring the bisection of an angular extent might perform better if trained always to make their final movement to the left. (Authors' abstract, condensed)

1489

Gregg, L. W., 1952
and W. J. Brogden
THE EFFECT OF SIMULTANEOUS VISUAL STIMULATION ON ABSOLUTE AUDITORY SENSITIVITY. — Jour. Exper. Psychol., 43 (3): 179-185. 1952. DLC (BF1.J6, v. 43)

Auditory thresholds were measured under three conditions of auxiliary visual stimulation. A small light patch was fixated by the subject, and increases in the brightness of the patch of zero, .015, and .055 ml. were used. For each subject three auditory thresholds were determined under each of these light conditions. One group of 18 subjects received instructions to report the presence or absence of the light as well as that of the tone; another group of 18 subjects made no specific response to the light and were instructed to report presence or absence of the tone only. The results showed a significant elevation of the auditory thresholds for the light increases when a specific verbal response to the auxiliary stimulus was required, and a significant lowering of the thresholds, as the brightness of the light increased, when no response to the auxiliary stimulus was required. (Authors' abstract, modified)

1490

Grewe, J., 1952
and G. Vogel
[INVESTIGATIONS CONCERNING THE INFLUENCE OF THE LABYRINTH ON THE TONUS OF THE STRIATED SKELETAL MUSCULATURE OF THE FROG] Untersuchungen über den tonisierenden Innenohreinfluss auf die quergestreifte Skelettmuskulatur des Frosches. — Pflügers Archiv für die gesamte Physiologie (Berlin), 254 (4): 360-376. 1952. In German.
DLC (QP1.A63, v. 254)

Frogs were unilaterally labyrinthectomized, and twitches of the gastrocnemius muscles of both legs elicited by induction currents were simultaneously recorded. Characteristic anomalies of the body position were observed, such as tilting of the head, flexion and abduction of the extremities on the side operated on, and contralateral extension and abduction of the extremities. These anomalies are most pronounced on the second day following the operation. Upon maximal stimulation, the amplitude of the twitch curve is reduced on the labyrinthectomized side relative to the intact side, while its latency period is doubled; the duration of the twitch is about identical on both sides. No changes of chronaxia were observed. Spinal injection of 0.1 mg. Veratrin caused an increase in primary and secondary twitches on the labyrinthectomized side, in contrast to the contralateral muscle. The effects of the drug disappeared faster on the intact side. A similarity is noted between the reaction of the muscle on the labyrinthectomized side and a muscle affected with beginning or partial nervous degeneration.

1491

Grimm, J. R. 1953
EFFECT OF EXTREME LOW GROUND TEMPERATURES ON AIRCRAFT COMPARTMENT TEMPERATURES. — Wright Air Development Center. Directorate of Air Weapon Systems, Wright-Patterson Air Force Base, Ohio. Technical Note no. WCOWP 53-6, Aug. 3, 1953. 8 p. (RDO no. 560-87). AD 30 376
UNCLASSIFIED

Efforts were made to determine (1) the effect of extremely low arctic ground temperatures on the compartment temperatures of statically exposed aircraft and (2) the minimum temperatures to which equipment located within these compartments will be subjected. Outside air temperatures (OAT) of -40°C. or lower existed for approximately 47 of the 67 hours of observation. The minimum compartment and outside air temperatures were -50°C., while the United States Air Force design requirements are -54°C. Aircraft compartment temperatures varied with the OAT. The compartment temperature can be expected to stabilize at the OAT within 4 hours if the OAT is stable at least during

that period and heat is not provided the aircraft for at least 13 hours. Small equipment items located in these compartments will be exposed to, and will stabilize at, the OAT within approximately 6 hours, while larger items, because of their mass, will not reach the OAT unless it exists for 18 to 25 hours. (AD abstract, modified)

1492

Grimm, J. R. 1953a
EFFECT OF DESERT ENVIRONMENT ON B-47B AIRCRAFT COMPARTMENT TEMPERATURES. — Wright Air Development Center. Directorate of Air Weapon Systems, Wright-Patterson Air Force Base, Ohio. Technical Note no. WCSPE 53-13, Oct. 15, 1953. 14 p. (RDO no. 560-87). AD 30 338 UNCLASSIFIED

A B-47B aircraft was exposed for three days to desert heat with all protective covers removed and hatches and entrances closed. The outside air temperature (OAT) was measured at several levels above the ground at the aircraft and recorded at the weather station. The maximum OAT was 40°C. (104° F.); the relative humidity (RH) varied from 61 to 9%, dependent upon the OAT. The maximum temperature 1 in. above the ramp was 48° C. (118° F.), and at 3 ft. above the ramp, 45° C. (113° F.). Cloud cover did not exceed 1% during the test period. Solar radiation produced a maximum temperature of 97° C. (206.6° F.) at the pilot's head level; the temperature in this area remained above 71° C. (160° F.) for about 8 hours each day. The instrument panel reached 80° C. (176° F.) and remained above 71° C. (160° F.) for 4 hours each day. Solar radiation had its least effect in the bomb-bay area where the OAT and the ambient compartment temperatures most nearly coincided. The USAF 71° C. requirement is regarded as not unrealistic. (AD abstract)

1493

Grings, W. W. 1953
SHIPBOARD OBSERVATION OF ELECTRONICS PERSONNEL: SHIPBOARD ACTIVITIES OF ELECTRONICS TECHNICIANS. — Univ. of Southern California. Dept. of Psychology, Los Angeles. Technical Report no. 4, March 1953. vii+95 p. (Contract Nonr-22802). AD 16 345 UNCLASSIFIED

This report, which deals primarily with the operational aspects of electronics personnel activities, presents, in Part IV, an itemized listing of requirements for the electronics technician. In order to quantitatively access these requirements, a scale of nineteen ability traits is set up, each of them rated in terms of the amount of ability required for successful mastery of the job. Traits necessary in planning and decision making are rated highest, including the abilities to recognize and define problems, to accept personal and organizational responsibilities, and to make sound decisions. Other desirable behavior traits are established on the basis of personal interviews, direct observation of men at work, good work habits, thoroughness, and the use of organized procedures.

1494

Grings, W. W. 1953a
A COMPARISON OF THE EFFECTS OF FOUR DISPLAY CONDITIONS ON THE DISCRIMINATION LEARNING OF SIMULATED SONAR ECHO-RETURNS: — Univ. of Southern California. Dept. of Psychology, Los Angeles. Technical Report no. 8, Aug. 1953. v+23 p. (Contract Nonr-22802). AD 24 367 PB 113939

Five 18-subject groups participated in a study of the discrimination learning of the following types of short-duration stimulus patterns: aural (A), visual (V), simultaneous A-V, and successive A-V or V-A displays. Rates of discrimination were determined by the number of correct switch-pressing responses per stimulus pattern. The rate was highest for the A display group, intermediate for the combined display group, and lowest for the V display group. About the same amount of learning resulted from the simultaneous and the successive displays. The number of amplitude peaks was an easier cue for discrimination than the shape of the peaks. (AD abstract)

1495

Grings, W. W. 1953b
A METHODOLOGICAL STUDY OF ELECTRONICS TROUBLE SHOOTING SKILL: I. RATIONALE FOR AND DESCRIPTION OF THE MULTIPLE-ALTERNATIVE SYMBOLIC TROUBLE SHOOTING TEST. — Univ. of Southern California. Dept. of Psychology, Los Angeles. Technical Report no. 9, Aug. 1953. v+42 p., 2 charts. (Contract Nonr-22802). AD 24 368 PB 113940

The Multiple-Alternative Symbolic Trouble Shooting test was developed for measuring specific aspects of problem-solving skill. The test format forced the subject to determine his own solution to trouble-shooting problems by providing no standard list of alternatives or choice of discriminations. For each problem about 500 different readings were available from which the subject could find cues. The problem information for the test was empirically determined and contained no theoretical values. A detailed protocol of the subject's behavior during the test may be recorded for studying differences between successful and unsuccessful subjects. The underlying conception of trouble-shooting is discussed as related to problem-solving in general and to an electronics situation in particular. (AD abstract)

1496

*Grodzhenskiĭ, D. E. 1953
[ABSORPTION OF SODIUM PHOSPHATE FROM THE DIGESTIVE TRACT DURING HYPOXEMIA] Vsasyvanie fosfata natriia iz pishchevaritel 'nogo trakta pri gipoksemii. — In: Trudy po primeneniiu radioaktivnykh izotopov v meditsine, Medgiz p. 239-241. Moskva, 1953. In Russian.

A Na_2HPO_4 solution labelled with radioactive P_{32} was infused into the stomach of 12 rats. Six animals were placed for 2 hours at 6700 m. simulated altitude; 6 animals served as controls. The

animals were then killed, and the phosphorus content determined in various organs. The specific dynamic action values obtained in the muscles, brain, spleen and kidney were approximately equal in both groups of animals; those in the liver and blood serum were somewhat higher in the controls, which indicates a slackening of phosphorus absorption from the intestine during hypoxemia. A fractioned testing of phosphorous components in the liver has shown that a 2-hour sojourn in the barochamber did not lead to changes in the esterification speed of phosphorus in the liver. [Abstract in: Referativnyĭ Zhurnal, Biologiĭa (Moskva), 1955 (15): 225. DLC (QH7.A5433)]

1497

Groen, J. J., 1952
O. Lowenstein, and A. J. H. Vendrik
THE MECHANICAL ANALYSIS OF THE RESPONSES FROM THE END-ORGANS OF THE HORIZONTAL SEMICIRCULAR CANAL IN THE ISOLATED ELASMOBRANCH LABYRINTH. — Jour. Physiol. (London), 117 (3): 329-346. 1952. DLC (QP1.J75, v. 117)

The mechanical properties of the cupula-endolymph system were subjected to experimental tests by means of the oscillographic method of recording from the nerve supplying the horizontal semicircular canal of the isolated labyrinth of the ray (Raja clavata). Tests on torsion swing and turntable furnished conclusive evidence that the cupula endolymph system behaves like a true pendulum. On the basis of the measurements made, the quotients;

$$\frac{\text{moment of friction at unit angular velocity}}{\text{cupula restoring couple at unit angle}}$$

and

$$\frac{\text{moment of friction at unit angular velocity}}{\text{moment of inertia of endolymph}}$$

were computed and the latter value compared with a theoretical value deduced from the dimensions of the system. The values were found to be in fairly good agreement. During the tests, sense organs deviating from the expected mode of behaviour were encountered, but a simple physical model (the characteristic curve of an electronic valve) renders possible a unified description of all behaviour types of semicircular canal organs. Questions relating to the vulnerability of the cupula-crista system to excessive stimulation, and to the so-called secondary aftersensation in man, are discussed on the basis of the experimental results. (From the authors' summary)

1498

Grognot, P. A. 1953
VARIATIONS OF THE RATE OF SANGUINE EOSINOPHILES OF MAN SUBMITTED TO AN ULTRA-SONOROUS VIBRATION OF THE SAME CHARACTERISTICS AS THAT PRODUCED BY CERTAIN TURBO-REACTORS. — Jour. Aviation Med., 24 (1): 73-76. 1953. DLC (TL555.A1A4, v. 24)

This is an English translation of the French paper, Grognot, P., 1952a.

1499

Grow, M. C. 1953
ESTABLISHING THE USAF MEDICAL SERVICE. — U. S. Air Force Medical Service Digest, 4 (7): 2-4. 1953. DNLM

On the occasion of the fourth anniversary of the U. S. Air Force Medical Service, the historical development of the research program is outlined, and the objectives of the service are restated. The accomplishments of the service lie in the fulfillment of its objectives: (1) development of a beneficial program of aeromedical research, (2) establishment of a flexible medical organization, and (3) recognition of aviation medicine as a specialty.

1500

Guedry, F. E. 1953
THE RETENTION OF EFFECTS OF "MASSED" AND "DISTRIBUTED" VESTIBULAR STIMULATION AS INDICATED BY THE DURATION OF THE OCULOGYRAL ILLUSION. — Tulane Univ., New Orleans, La. (Contract N7onr-434, Task Order I); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 063.01.33). Joint Project Report no. 33, July 1, 1953. 20 p. AD 17 532 UNCLASSIFIED

The influence of the distribution of rotational practice trials was studied in relation to (1) rate of habituation to the rotation and (2) retention of the habituation. After preliminary indoctrination, 20 subjects received 39 separate rotational trials and reported the rotational and postrotational durations of oculogyral illusion, a form of apparent motion observed following stimulation of the semicircular canals. One group received rotational trials massed into a single period, while the other group received trials distributed over four daily sessions. The rates of habituation of the two groups were not significantly different. Results of the tests of retention, given seven days after habituation, suggested that the massed series produced greater retention. The habituatory effect of visual stimulation did not generalize to a vestibular stimulus with an opposite directional component. (AD abstract)

1501

Guedry, F. E. 1953a
THE TRANSFER OF HABITUATION TO ROTATION WITH RESPECT TO THE MAGNITUDE OF THE VESTIBULAR STIMULUS. — Tulane Univ., New Orleans, La. (Contract N7onr-434, Task Order I); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 063.01.34). Joint Project Report no. 34, July 10, 1953. 19 p. AD 17 609 UNCLASSIFIED

Twenty human subjects received tests of the duration of the oculogyral illusion under two angular velocities before and after a series of 39 rotation trials in which an intermediate angular velocity was employed. The following inferences were made from the results: (1) Habituation is not specific to the "practiced" angular velocity. (2) Habituation to a given intermediate stimulus will produce greater

response reduction to stimuli of lesser magnitude and lesser response reduction to stimuli of greater magnitude than is obtained with the intermediate stimulus. This means that although the responses are reduced by the habituation series, the responses are indicative of a greater sensitivity to differences in vestibular stimuli after than before the habituation series. (3) Comparisons of the results prior to the habituation series have implications for theories of the vestibular end-organ which are discussed briefly. (4) Comparison of the rotational and postrotational results suggests that visual stimulation such as that produced by full room illumination has an habituatory effect which does not generalize to vestibular stimuli with opposite directional components. (Author's summary)

1502

Guedry, F. E. 1953b

THE TRANSFER OF HABITUATION TO ROTATION WITH RESPECT TO THE DIRECTIONAL ASPECT OF THE VESTIBULAR REACTION. — Tulane Univ., New Orleans, La. (Contract N7onr-434, Task Order 1); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project report no. NM 001 063.01.35). Joint Project Report no. 35, Sept. 1, 1953. 12+8 p. AD 21 029 UNCLASSIFIED

This is a study of the manner in which "directionally" opposite vestibular stimuli, applied in close proximity, interact to influence the transfer of habituation with regard to rotation direction. Thirty human male subjects, comprising three groups of ten subjects, received clockwise and counterclockwise rotatory tests of vestibular function before and after a habituation series of 34 clockwise rotation periods. Differential treatment of the groups consisted of the rotation-time/rest-time ratios employed during the habituation series. The experimental results and literature reviewed led to the following conclusions: (1) With repeated trials in which vestibular effects are counteracted by opposing vestibular stimulation, habituation to rotation may occur but may not be manifest if the trials used to test for its presence are, in effect, stronger vestibular stimuli than those used in the habituation series. (2) Previous investigators concluded that the time over which the vestibular response may act without interference is a factor which governs the occurrence of transfer of habituation from the practiced to the unpracticed direction. This conclusion is not refuted by the present experiment. However evidence is presented which indicates that conditions of visual stimulation may be of primary importance to these transfer effects. (Author's summary)

1503

(Guggenheim Aviat. Safety Center) 1953

SURVEY OF RESEARCH PROJECTS IN THE FIELD OF AVIATION SAFETY. — Cornell Univ. Daniel and Florence Guggenheim Aviation Safety Center, New York. Annual Supplement no. 2, Jan. 1953. AD 6081 UNCLASSIFIED

Information on current research is classified alphabetically by subject from information supplied by government agencies, laboratories, industries, and universities; projects from Canada and Great Britain are included. The following fields are covered: accident prevention and protection; aerodynamics; air transportation; aircraft instruments; airplane design; airports and airways; aviation medicine; comfortization; education and training; electronics; hydraulic, pneumatic, and electrical equipment; flight testing; fuels and lubricants; materials; meteorology; military operations; navigation; operating problems; photography; power plants; propellers; research facilities; rotary wing aircraft; and structures. Each entry contains the title, a concise description of the project, the sponsoring agency, and the company or laboratory at which the research is being conducted, and a reference number to the project sheet in the files of the Center. Projects completed or discontinued during 1951 are also listed. (AD abstract)

1504

Guibert, A., 1952
and C. L. Taylor

RADIATION AREA OF THE HUMAN BODY. — Jour. Applied Physiol., 5 (1): 24-37. 1952. DLC (QP1.J72, v. 5)

A method for determining directly the area of that part of the body surface which takes part in radiation exchange with the surround is described, together with results obtained for three subjects of divergent body shape and for four different body postures. The analytical basis of the method is developed from the concept of the local shape factor integrated over all space. The experimental procedure involves the photographing of the human subject at a fixed distance in excess of 15 feet, from 32 viewing angles chosen to sample effectively the surface of a hemisphere described about the sagittal plane as equator. Data were obtained by this method for the nude radiation area of an 'average' young man, whose body dimensions closely approximate those of the Air Force median cadet, in four distinct postures described as erect, semierect, seated, and crouched. The influence of clothing was evaluated for the average man in the erect posture, with limited additional observations in the other three postures. While radiation area is a function of posture, as expected, no evidence for a relationship with body type was found. The results are best expressed in the form of a factor expressing radiation area as a proportion of the total body surface area. The average values of this radiation area factor for nude subjects in the four postures from erect to crouched are 0.77, 0.72, 0.70 and 0.65, respectively. For the light clothing used, the average value of this ratio was 1.14. (From the authors' summary and conclusions)

1505

Guillemin, V., 1953
and P. Wechsberg

PHYSIOLOGICAL EFFECTS OF MECHANICAL VIBRATION. — Univ. of Illinois, Urbana; issued

by School of Aviation Medicine, Randolph Field, Tex. Jan. 1953, 16 p. (Project no. 21-1203-0002). AD 5953 PB 108697

Same as the paper, Guillemin, V., 1952.

1506

Guillemin, V., 1953a
and P. Wechsberg
PHYSIOLOGICAL EFFECTS OF LONG TERM REPETITIVE EXPOSURE TO MECHANICAL VIBRATION. — Jour. Aviation Med., 24 (3): 208-221. 1953. DLC (TL555.A1A4, v. 24)

Young adult albino rats were subjected to long-term, repetitive exposures to vibration. One group of 8 rats was kept in a vibrating-floor cage operating at 3,600 cycles per minute for a schedule of vibration totaling 1000 hours followed by a rest period of 30 days, and then subjected to a second exposure of 300 hours. A second group of 10 animals was exposed to vibrations of 7,200 c.p.m. for 700 hours. The physiological effect of vibration was evaluated in terms of the vascular-tonus response of the hind extremities to a standard technique of chilling. The test consisted of chilling the hind paws and legs in still, cold air until skin temperatures reached 57°F. and then rewarming at room temperature. The normal (control) rewarming times were all under 90 minutes and mostly under 60 minutes. In the first group of animals, 71% had rewarming times exceeding 90 minutes after 1000 hours of exposure to vibrations of 3,600 c.p.m.; in the second group, 75% had rewarming times of over 90 minutes after 700 hours of exposure to 7,200 c.p.m. Microscopic examination of rat paw capillaries in vivo indicated that capillaries of vibrated animals showed more tortuous forms and greater engorgement than those of the controls. (cf. Guillemin, V., 1952, 1953)

1507

Guillerm, R., 1953
and R. Badré
[METHODS OF SAMPLING AND ANALYSIS OF ALVEOLAR AIR: A NEW TECHNIQUE] Les méthodes de prelèvement et d'analyse de l'air alvéolaire: une nouvelle technique. — Médecine aéronautique (Paris), 8 (2): 137-148. 1953. In French. DLC (TL555.M394, v. 8)

Methods of alveolar air sampling are reviewed. All sampling techniques derive from two classical methods: (1) the Haldane and Priestley method (taking alveolar air after forced expiration), and (2) the Henderson and Haggard method (supplemental air [the terminal portion of normal expiration] is collected in a mouth piece provided with two valves). Both tests display certain deficiencies. The alveolar air referred to by Haldane deviates from true alveolar values. The supplemental air measured by the Henderson and Haggard method corresponds qualitatively but not quantitatively to the alveolar variations. Both tests are only applicable to subjects at rest. -- The combination of the two tests devised by the authors makes use of an instrument consisting of a molded rubber half-mask; the mask is provided with an inspiratory valve at the lower part of the mask, and an expiratory valve at the prebuccal region of the mask CO_2 values are computed by spectrographic analysis yielding quick and precise results. Oxygen is quantitatively analyzed by using the Beckmann apparatus which utilizes the paramagnetic capacity of O_2. With each inspiration the expiratory valve closes and the sampled air enters the expiratory tube; this air is the terminal portion of the previous expiration. The analysis of the supplemental air gave the following mean values: CO_2=43 mm. Hg; O_2=110 mm. Hg. The corresponding alveolar air values were: CO_2=45 mm. Hg; and O_2=103 mm Hg.

1508

Guimaraes, G. 1953
[DEVELOPMENT OF AVIATION MEDICINE IN BRAZIL] Evolucao da medicina aeronáutica no Brasil. — Revista médica da aeronautica (Rio de Janeiro), 5 (1): 111-112. 1953. In Portuguese. DNLM (W1. RE609, v. 5)

The development of aviation medicine in Brazil is described in chronological order, covering the period of 1866-1953. A facsimile of the first document published on the subject of aviation medicine in Brazil, containing a list of physical criteria for pilot candidates in 1919, is also submitted. A diagram of cities where aviation medicine centers are located is included.

1509

Guns, P., 1953
A. Gillain, and E. Doyen
[ANTIHISTAMINICS AND MOTION SICKNESS] Antihistaminiques et le mal du movement. — Annales d'oto-laryngologie (Paris), 70 (8-9): 496-502. 1953. In French. DNLM

An experimental study of the peripheral vestibular reactions was made after oral administration of (1) 50 mg. Dramamine, (2) 25 mg. Postafene (dichlorhydrate of p-chlorbenzhydryl m-methylbenzyldiethylene diamine), (3) 50 mg. pyribenzamine (benzyl and pyridil dimethylethylenediamine hydrochloride), and (4) 50 mg. Soventol (n-phenyl n-benzyl 4-amino 1-methylpiperidin hydrochloride). Before and after administration, the duration of nystagmus was measured. Results showed that Dramamine does not influence the duration of nystagmus, but diminishes the subjective sensation of vertigo. Postafene diminishes nystagmus 4 times out of 6, and vertigo 5 times out of 6. After administration of Pyribenzamine, the nystagmus reaction varies, and vertigo is decreased. Soventol was ineffective in 5 cases out of 6. These results were confirmed clinically. It is concluded that anti-allergic drugs have a definite effect on vertigo. No anti-allergic drug should be administered before vestibular tests have been made.

1510

Gurevich, V. G., 1952
L. I. Belkina, and A. V. Nenartovich
[A RAPID METHOD OF DETERMINING CARBON MONOXIDE IN THE AIR] Ekspressnyĭ metod opredeleniia okisi ugleroda v vozdukhe. — Novosti meditsiny (Moskva), 26: 62-64. 1952. In Russian. DNLM (W1. N0961, v. 26)

The description of a very rapid method of determining the presence of carbon monoxide is presented. The device consists in a V-shaped glass tube of 4-5 mm. inner diameter, each branch being 120 mm. long. The indicator, a finely granulated green-yellow substance, fills one of the branches and half of the other. The air containing CO penetrates the half-filled branch of the tube at the rate of 25 ml./min., at approximately 35°C. (the temperature of the hand which is holding it), for 3 min., 30 sec. The sensitivity of the indicator is such that color changes are effected at some ten thousandths of a milligram of CO, and a 0.01 to 1 mg. CO concentration can be determined in 1 l. of air with an accuracy of 1/100 mg. The method is selective to CO; such commonly encountered gases as hydrogen sulfide, sulfuric acid, nitrogen oxides, ammonium, benzene, hydrogen, etc. do not affect the indicator. No preliminary setting of the apparatus is necessary; the analysis is simple and fast. The authors indicate that this method is in its introductory phase, and consider this report as preliminary.

1511

Guy, B. L. 1953
DIGEST OF UNSATISFACTORY REPORTS, ACCIDENT BRIEFS AND INCIDENT REPORTS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note no. WCRD 53-131, Oct. 15, 1953. 5 p. (Project no. S-660-157). AD 24 576
UNCLASSIFIED

Unsatisfactory reports as well as accident and incident reports were studied in an attempt to determine the causes contributing to the failure of oxygen equipment aboard U.S. Air Force aircraft. Two causes contribute largely to the incidents resulting in fatal and nonfatal accidents: (1) a lean mixture of oxygen being received at 10,000- to 25,000-ft. altitudes; and (2) oxygen masks becoming completely disconnected from the oxygen regulator delivery tubing. It was believed that greater emphasis during training of flight personnel on the importance of oxygen equipment and its proper use would reduce the number of unsatisfactory reports, accidents, and incidents attributed to oxygen equipment. The unsatisfactory conditions are in the process of being or have been corrected. (AD abstract)

1512

Guyton, A. C., 1952
and L. Adkins
RELATIONSHIP OF ABDOMINAL PRESSURE TO VENOUS PRESSURES IN THE LOWER BODY [Abstract]. — Amer. Jour. Physiol., 171 (3): 731. 1952 DLC (QP1.A5, v. 171)

Abdominal pressure at the hydrostatic level of the inferior vena cava in dogs anesthetized with pentobarbital and lying on their backs, as determined by the pressure barely required to inject fluid into the abdomen, has measured between 5 and 9 mm. Hg. As a catheter is passed up the inferior vena cava, the recorded pressure remains slightly above abdominal pressure until the catheter suddenly enters the chest, at which time the pressure falls immediately to a value usually a mm. or more below atmospheric pressure. From a consideration of the flow of fluids through collapsible tubes and from studies performed on dead dogs, it has been shown that the flow of blood through the abdominal veins is not affected by the level of auricular pressure as long as it remains lower than the pressure in the abdominal veins, but just as soon as the auricular pressure rises above the intra-abdominal pressure, the return of blood to the heart begins to be impeded. Because pressure in the inferior vena cava is usually several mm. greater than right auricular pressure, it follows that the right heart must fail considerably before return of blood from the abdomen is affected. Finally, it has become evident that greatly increased intra-abdominal pressure blocks the return of blood from the legs to such an extent that pooling of blood and fluid loss into the tissues results. (Complete abstract)

1513

Haber, F., 1953
and H. G. Clamann
PHYSICS AND ENGINEERING OF RAPID DECOMPRESSION. A. GENERAL THEORY OF RAPID DECOMPRESSION. — School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii+29 p. (Project no. 21-1201-0008, Report no. 3). AD 20 374 PB 112409

Theoretical considerations indicate that the analysis of the entire process of rapid decompression can be split into two parts. The first one includes the geometrical and aerodynamic quantities of the system under consideration and can best be represented by a term which is called time-constant, because it sets the time scale for the entire process. The second part contains a pressure function, which determines the dependence of the process upon the pressures involved. The initial rate of pressure change is discussed and presented in a similar fashion. The experiments are in good agreement with the theory. (Authors' abstract)

1514

Haber, F. 1953a
ESCAPE AND SURVIVAL AT HIGH ALTITUDE. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+11 p. (Project no. 21-1207-0006). AD 19 613 PB 112369

The speed of future aircraft will be limited by the temperatures caused by aerodynamic heating. Thermal considerations call for high altitudes if flying speed is increased. At the high altitudes required, windblast and dangers of escape proper will be reduced. The phase of free fall should last much longer after bailouts. High speeds attained in such falls create decelerations which could be dangerous. (Author's summary)

1515

Haber, F. 1953b
HUMAN FLIGHT AT THE LIMITS OF THE ATMOSPHERE: G-FORCES AND WEIGHT IN SPACE

TRAVEL. — Jour. Brit. Interplanetary Soc., 12: 32-34. 1953. DLC (TL790. A1B7, v. 12)

This is a general discussion of the problem of body weight with respect to human subjects traveling in rockets to the upper limits of the atmosphere and beyond. In a rocket take-off, the acceleration (and weight) will increase toward the end of the propulsion period. The human body can, for a maximum of 3 minutes, tolerate 11 g in the prone position and 14 g in the supine position. These tolerances will effectively limit the acceleration of a rocket with human cargo. Assuming that the initial stage of rocket flight is achieved with the passengers still in good condition, the problem of weightlessness must next be overcome. It is expected, on the basis of animal experimentation, that no major circulatory disturbances will develop; but there might be some difficulty in orientation and muscular coordination. The effects of prolonged weightlessness, are however, unknown — either with regard to animals or humans.

1516

Haber, H. (Editor) 1953
PROCEEDINGS OF A SYMPOSIUM ON FRONTIERS OF MAN-CONTROLLED FLIGHT. — x+109 p., 2 charts. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670. C25, 1953)

The Symposium was presented at Los Angeles, California, on April 3, 1953, by the Institute of Transportation and Traffic Engineering and University Extension, University of California, in collaboration with The Aero-Medical Engineering Association and The Institute of the Aeronautical Sciences, Los Angeles Section. Papers by the following authors are abstracted separately:

Blockley, W. V.	1953
Buettner, K. J. K.	1953
Christenson, C. M.	1953
Haber, H.	1953
Kaplan, J. (Chairman	1953
Lippert, S.	1953
Lombard, C. F.	1953
Lyman, J. H.	1953
Mayo, A. M.	1953
Morehouse, L. E.	1953
Roscoe, S. N.	1953
Roth, H. P.	1953
Shank, R. J.	1953
Tobias, C. A.	1953
Warren, N. D.	1953
Yeager, C. E.	1953

1517

*Hahn, P. 1953
[RESISTANCE CHANGES TO ANOXIA IN RATS DEPENDING ON AGE] Zmeny v odolnosti vůči anoxii během postnatálního vývoje krysy. — Československa fysiologia (Praha), 2 (3): 297-305. 1953. In Czech. DNLM

Rats were subjected to anoxia at 15, 500 m. simulated altitude. The animals' resistance was found to decrease in steps. From the age of 17 days on it did not differ from that of the adults. In a pure nitrogen or carbon dioxide atmosphere the resistance dropped very rapidly in rats older than 3 days, reaching the level of adult resistance in rats 17 days old. In an atmosphere of nitrogen and 6% oxygen the animals' resistance dropped very rapidly between the 7th and 17th day of life. Injections of sodium fluoride and mono-iodoacetic acid decreased the resistance to all types of anoxia at the rate of 2 minutes for monoiodoacetic acid, and 6 minutes for sodium fluoride, until the 15th day of life, 2 minutes after the 17th. The author concludes that the anaerobial metabolism predominates in the first 7 days of life, which explains the higher resistance to anoxia; from the 7th to 17th day it changes to a purely aerobial form. [Abstract in: Referativnyĭ Zhurnal. Biologiîa (Moskva), 1955 (2): 276-277. DLC (QH7. A5433)]

1518

Halbouty, M. R., and D. R. Long 1953
NEUROCIRCULATORY COLLAPSE IN AIRCRAFT FLIGHT: REPORT OF A CASE. — Jour. Aviation Med., 24 (4): 301-307. 1953.
DLC (TL555. A1A4, v. 24)

Neurocirculatory collapse is a condition which is most frequently observed following ascent to simulated altitudes of 30,000 feet or more in an altitude chamber, but may be seen to occur as a result of actual flight to similar altitudes in the present day aircraft. An example of a case of the latter has been presented; that of an experienced 47-year-old male pilot riding as a passenger in a fight-type (T-33) jet aircraft. Although the exact patho-physiological changes which occur in the human body with this condition are not fully understood, it is believed that maladjustment of the autonomic nervous system may be responsible for the severity of some of the cases. The causative factor in the development of this clinical syndrome is thought probably to be an ischemic hypoxia resulting from gaseous emboli and/or vasospasm. Therapy of neurocirculatory collapse is essentially a conservative plan of symptomatic treatment of any organ system which may become involved, with particular emphasis placed on the necessity of guarding against the development of secondary shock. (Authors' summary, modified)

1519

Hale, E. B. 1953
BEHAVIORAL AND STRESS EFFECTS OF SOUND ON ANIMALS. — Pennsylvania State Coll., State College (Contract AF 33(038)-786); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-282, June 1953. iv+24 p. (RDO no. 695-63). AD 25 577
UNCLASSIFIED

Sound fields approximating white noise (121 ± 6 db., 0 to 10 kc.) were observed to have behavioral and stress effects on nonseizure rats. The

activity of male rats greatly reduced during exposure to sound, but increased compensatorily afterwards. Under extreme motivation, e.g., hunger, there was indication that the inhibiting effect of noise might be lost. Infantile auditory stimulation of male rats resulted in increased emotionality at 35 to 45 days of age, an effect which persisted into adulthood (90 days). Females were not affected by exposures during infancy. Maze learning and retention of previously learned maze patterns were not affected. The stress or stimulating effect of sound was indicated by increased adrenal cortical activity of male rats during a 48-hr. exposure to noise. The weight of the adrenal glands and the size of the active cortical zones increased significantly. Survival time of fasting rats was reduced. The endocrine effect was limited to males and the survival effect to one of two strains, which indicated that sensitivity to noise depended on the genetic constitution of the animal. Noise did not increase the formation of stomach ulcers, interfere with reproductive functions in the female rat, or activate the adrenal cortex of human subjects during a brief exposure period. (AD abstract)

1520

Hale, H. B. 1953
OBSERVATIONS ON MEN EXPOSED TO HYPOXIA AT DIFFERENT ENVIRONMENTAL TEMPERATURES. — Federation Proceedings, 12 (1[I]): 59-60. 1953. DLC (QH301.F37, v. 12)

Changes in circulatory system, respiratory system, body temperature, and adrenal cortical function were followed in male subjects during standardized exposures to low barometric pressure under 2 different conditions of temperature (80° and 120° F) in an effort to determine the extent to which adjustments to heat interfere with or otherwise modify responses to hypoxia. In 19 subjects, exposed to 18,000 feet simulated altitude for 15 minutes, 12 demonstrated an elevated heart rate when overheated. Seven showed a more rapid heart rate when in the comfort range. Any elevation in heart rate, due to heat, occurred before or after the hypoxia phase; a truly "additive" effect was not seen during hypoxia. That time is an important factor was shown by the fact that a second group of subjects, breathing a 10% oxygen-nitrogen mixture, demonstrated a slowing of the heart rate after 15 minutes exposure to hypoxia at 80° F, but at the higher temperatures the heart rates either continued to climb throughout the exposure period or suddenly dropped to subnormal levels. (Author's abstract, modified)

1521

Hall, A. L. 1953
INVOLUNTARY HYPERVENTILATION DURING PRESSURE BREATHING AT 43,000 FEET. — Jour. Aviation Med., 24 (1): 14-19. 1953.
DLC (TL555.A1A4, v. 24)

Following an analysis of various types of hyperventilation, the hyperventilation which occurs during pressure breathing at altitude is discussed. Thirty-six healthy, young Navy seamen were placed, in groups of six, in a low-pressure chamber at a simulated altitude of 43,000 feet. The oxygen breathed was under pressure of 10 inches of water. Four criteria designated involuntary hyperventilation: (1) arterial blood oxygen saturation of at least 85%; (2) increasing arterial blood oxygen saturation; (3) symptoms of dizziness, tingling of extremities, and muscle cramp; and (4) observation of hyperpnea. Forty-three cases of hyperventilation were observed during 695 exposures. The hyperventilation syndrome may proceed to a "point of no return" resulting in unconsciousness; this is apparently due to fear inducing more hyperventilation.

1522

Hall, F. G. 1953
THE ROLE OF CARBON DIOXIDE IN ALTITUDE TOLERANCE. — March 1953. iv+30 p. Duke Univ. School of Medicine, Durham, N. C. (Contract W33-038-ac-14101); issued by Wright Air Development Center, Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-57 (RDO no. 696-77). AD 23 807
UNCLASSIFIED

When man breathes ambient air at high altitudes, a hypoxic stimulus causes a rapid increase in breathing. This leads to an abnormal loss of carbon dioxide from his blood. When carbon dioxide is added to the inspired air, a still greater increase in breathing occurs. This demonstrates that the two stimuli to breathing are additive in their effect. When carbon dioxide is added to inspired air of subjects breathing ambient air at altitude, the time of consciousness is increased. This is due mainly to the increased supply of oxygen to the blood by virtue of increased lung ventilation. The hypoxic and carbon dioxide stimuli to breathing act independently at altitude. When both are strong they act additively. When however the partial pressure of oxygen in the lungs fall below a certain level, the hypoxic stimulus alone regulates breathing. Adding carbon dioxide to oxygen breathed by men at altitude seems to appreciably increase the elimination of nitrogen from their bodies. (Author's abstract)

1523

Hall, F. G. 1953a
CARBON DIOXIDE AND RESPIRATORY REGULATION AT ALTITUDE. — Jour. Applied Physiol., 5 (10): 603-606. 1953.
DLC (QP1.J72, v. 5)

Fourteen young men exposed to a simulated altitude of 22,000 feet breathed gas mixtures with varying concentrations of carbon dioxide. The partial pressures of oxygen and carbon dioxide in alveolar air were correlated with pulmonary ventilation measurements. The results indicated that hypoxic and carbon dioxide stimuli act independently to produce changes in pulmonary ventilation at altitude. When both are strong they act additively. When, however, the alveolar partial pressure of carbon dioxide falls below a certain level

as a consequence of an increased alveolar ventilation, the level of that ventilation would seem to depend solely upon the strength of hypoxic stimuli. (Author's summary)

1524

Hall, J. F., 1953
J. W. Polte, R. L. Kelley, and J. Edwards
COOLING OF CLOTHED SUBJECTS IMMERSED IN COLD WATER. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-323, April 1953. iv+34 p. (RDO no. 696-70). AD 22 232 UNCLASSIFIED

Average skin and extremity cooling rates of seven human subjects immersed in cold water (32°-39° F.) and wearing various amounts of insulation under an outer, water-impermeable, anti-exposure suit were determined in 26 experiments. The subjects were immersed to the neck level (approximately 92% of the body surface) while wearing underlying clothing of 2.3, 3.7, or 4.7 clo insulation respectively (1 clo = insulation necessary to maintain in comfort a sitting subject, at air movement of 20 ft./min., 70° F., and a humidity below 50%). On a basis of maximum safe exposure time and practical limitation of clothing bulk, the use of a minimum of 3.0-3.5 clo body insulation for cold-water immersion protection was indicated. Cooling of the upper extremity, particularly the hands, was extremely rapid and was the chief factor limiting tolerance time during cold-water exposure. In contrast, cooling of the lower extremity, particularly the feet, was neither critical nor a limiting factor in this type of cold-water immersion exposure. (Authors' abstract, modified)

1525

Hall, J. F., 1953a
and J. W. Polte
THERMAL INSULATION OF PROTECTIVE CLOTHING. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note no. WCRD 53-37, Dec. 1953. i+30 p. (RDO no. 696-70). AD 29 979 UNCLASSIFIED

Thermal insulation of various types of U.S. Air Force standard and experimental clothing items and assemblies has been determined with electrically heated copper manikins, and hand and foot models. Light, medium and heavy clothing types, sleeping bags, as well as hand- and footgear were included in the test measurements. The described method was developed at the Aero Medical Laboratory and results are expressed in thermal insulation of clothing units. Accuracy of the method ranges from ± 2.4 to ± 10.0%. Measurement of protective clothing insulation with this method serves as an effective screening procedure in the development of new and improved clothing end-items. (Authors' abstract)

1526

Hall, P. W. 1953
EFFECTS OF ANOXIA ON POSTARTERIOLAR PULMONARY VASCULAR RESISTANCE. — Circulation Research, 1 (3): 238-241. 1953. DNLM

In this experiment the object was to measure venous outflow volume under the effects of anoxia while maintaining constant arterial pressure. Pulmonary vascular resistance was studied in an isolated pulmonary lobe of an anesthetized dog by perfusing the lobe "in situ" with arterial blood from a carotid artery under regulated pressure, and inflating the lobe alternately with room air and nitrogen at 20 strokes per minute. Venous outflow was measured after each alternation of ventilation at various constant levels of pulmonary arterial pressure. Blood from the pulmonary artery was returned by way of a funnel to the jugular vein, except at the indicated time intervals when the venous blood was collected in a graduate cylinder for measurement. After the first ventilation of the lobe with room air, four aliquots of blood were measured for 5-10 sec. each. Then the lobe was flushed with nitrogen, and 15 sec. were allowed for gas equilibration. Aliquots were taken again after equilibration with nitrogen, and later, after room air was given. Arterial pressures were varied and venous samples collected as before. Pressure-flow relations in the perfused pulmonary lobe during the first minute after inflation with air or nitrogen showed that no generalized anoxia existed. Venous blood flow was greater during ventilation with room air, and there was a greater trend in divergence as the rate of flow and pressure increased. Reduction of alveolar oxygen produces slight, but definite increases in pulmonary vascular resistance which probably occur beyond the level of the pulmonary arterioles.

1527

Hallpike, C. S. 1953
THE DESIGN, CONSTRUCTION AND PERFORMANCE OF A NEW TYPE OF REVOLVING CHAIR. — Acta oto-laryngologica (Stockholm), 42 (6): 511-537. 1953. In English. DNLM

Construction and performance specifications are given of a new type of revolving chair, designed for the investigation of the functions of the horizontal semicircular canals in man. The chair is driven by a servo-mechanical system of conventional design and high precision. It provides angular accelerations within the range of $0.1°/sec.^2$ to $10°/sec.^2$. Any acceleration within this range may be applied for periods limited only by the attainment of an angular velocity of 150°/sec. -- a limitation imposed by certain physiological considerations. Provision is made for the direct observation of ocular nystagmus occurring during rotation. This is achieved by means of a prismatic viewing system which provides a stationary image of the subject's eye. Using this equipment, measurements have been made of the duration of the aftersensations resulting from the application of accelerations of known magnitude and duration. (Author's abstract, modified)

1528

Hallpike, C. S., 1953a
and J. D. Hood

THE SPEED OF THE SLOW COMPONENT OF OCULAR NYSTAGMUS INDUCED BY ANGULAR ACCELERATION OF THE HEAD: ITS EXPERIMENTAL DETERMINATION AND APPLICATION TO THE PHYSICAL THEORY OF THE CUPULAR MECHANISM. — Proc. Roy. Soc. (London), Series B, 141 (903): 216-230. 1953.
DLC (Q41.L7, v. 141)

Normal human subjects were rotated on a revolving chair with their vertex at the center of rotation, and per-rotatory nystagmus was observed. An optical technique was developed to compute values of cupular deflection at any time point during the application of the rotational stimulus, or following its removal. The method was based on the assumption that there exists a close quantitative correlation between rotational sensation, ocular nystagmus, and cupular angular deflection. Experimental evidence indicates that the speed of apparent target movement is proportional to the speed of the movement of its image across the retina during the slow component of nystagmus. The authors conclude that their experimental findings confirm the values given by Van Egmond et al. describing the physical constants of the cupula mechanism. (cf. Van Egmond, A. A. J., J. J. Groen, and L. B. W. Jongkees, Jour. Physiol., 110 (1 and 2): 1-7. 1949.)

1529

Hallpike, C. S., and J. D. Hood 1953b
FATIGUE AND ADAPTATION OF THE CUPULAR MECHANISM OF THE HUMAN HORIZONTAL SEMI-CIRCULAR CANAL: AN EXPERIMENTAL INVESTIGATION. — Proc. Roy. Soc. (London), Series B, 141 (905): 541-561. 1953.
DLC (Q41.L7, v. 141)

The nature of the physiological mechanism underlying the response decline of the cupula as the result of prolonged deflection has been studied in the human horizontal semicircular canal by means of a revolving chair of new design. Two human subjects, each with one normally functioning labyrinth (but on the opposite side) were used in the experiments. The normal duration of the oculogyral illusions following application of a standard test stimulus was determined, and then prolonged isodirectional angular acceleration was continued to bring about the response decline. The response decline was demonstrated by a considerable shortening of the after-sensation duration found to occur when the test stimulus was reapplied. The following conclusions were reached: (1) the response decline is due to end-organ adaptation and not to true physiological fatigue; (2) an increase of stimulus strength, with increase of cupular deflection, involves an increase in the number of activated receptors; (3) the adapting elements of the cupula show a directional specificity which results in a decrease of response to deflections in the same but not in the opposite direction; (4) more than one set of receptors is concerned with the nervous mechanism of the cupula; and (5) there is evidence of the existence of a non-adapting set in which the resting discharge originates and of a second adapting set which controls the responses of the first. (Authors' abstract, modified)

1530

Halpin, A. W. 1952
THE RELATION BETWEEN THE CREW'S PERCEPTION OF THE LEADERSHIP BEHAVIOR OF AIRPLANE COMMANDERS AND SUPERIORS' RATINGS OF THEIR COMBAT PERFORMANCE. — Amer. Psychologist, 7 (7): 309-310. 1952.
DLC (BF1.A55, v. 7)

This is the abstract of an address delivered at the 60th annual meeting of the American Psychological Association in Washington, D. C. (Sept. 1-6, 1952). Thirty-three B-29 commanders were described by their crews during training in the U. S. and after the crews had been in combat. Also analyzed were the ratings of the same commanders by their superiors on technical competence before and after service in the Far East Air Force, effectiveness in working with other crew members, conformity to standard operations procedure, performance under stress, attitude, motivation to be effective, and over-all effectiveness as a combat crew member. Correlations were established between ratings by superiors and opinions expressed by crew members. "Initiation of Structure" dimension was evaluated high in ratings by superiors, while opinions of crew members were not scored as a good leadership factor. The comparison of questionnaire replies and scores by superiors indicates that they are independent but not antithetical.

1531

Halpin, A. W. 1953
STUDIES IN AIRCREW COMPOSITION. III. THE COMBAT LEADER BEHAVIOR OF B-29 AIRCRAFT COMMANDERS. — Ohio State Univ. Personnel Research Board, Columbus (Contracts AF 33(038)-10105 and AF 18(600)-27); issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum no. TN-54-7, Sept. 1953. viii+24 p.
AD 54 071 PB 117041

A Leader Behavior Description Questionnaire was answered by 662 crew members who described their 89 respective aircraft commanders. Each questionnaire was scored on the leader behavior dimensions of Consideration and Initiating Structure. Commanders who score high on Consideration place a high premium upon friendship, and upon mutual trust and respect within the crew, and hence tend to avoid authoritarian and impersonal behavior. Initiating Structure refers to the commander's behavior in firmly establishing clear-cut patterns of organization, channels of communication, and ways of getting the mission accomplished. The correlations between the two leader behavior dimensions and the two sets of ratings secured from administrative superiors and crew members, respectively, show that: (1) the superiors tend to rate favorably those aircraft commanders who are characterized by high Initiating

Structure scores; and (2) the crew members tend to rate favorably those aircraft commanders who are characterized by high Consideration scores. Two immediate, practical implications follow from this study. First, in evaluating the combat leadership of aircraft commanders, it is important to take into account evaluations secured both from the commanders' superiors and from his crew. Second, the principal maxim which we can offer the aircraft commander who wants to improve his leadership skill is to stress both Consideration and Initiating Structure behavior. (From the author's abstract)

1532

Halstead, W. C. 1953
NEUROPSYCHOLOGICAL EFFECTS OF CHRONIC INTERMITTENT EXPOSURE TO NOISE. — In: Benox report: an exploratory study of the biological effects of noise, p. 96-111. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

Complaints of tiredness, irritability, insomnia, and possibly some reduction in libido, have been encountered in civilian maintenance workers who are intermittently exposed to the noise levels close to jet aircraft. There is, however, no objective evidence to date that intermittent exposure to present sound levels of approximately 140 db. is physiologically fatiguing per se. A marginal "stress" syndrome includes loss of information through the tactual route. This loss of information could be significant at the present time since many critical ground maintenance adjustments (especially in night operations) are carried out chiefly on a tactual basis. Neurotic tendencies, as operationally defined, were detected. The present findings are indecisive as to whether the observed impairment is reversible, and whether it is attributable to primary central nervous system effects of exposure to noise, to cryptic brain injuries, or to secondary involvement of the central nervous system via a neuro-humoral stressing mechanism. (From the author's conclusions)

1533

Hamburger, F. A. 1952
[THE EFFECTS OF BINOCULAR RIVALRY ON STEREOSCOPIC RANGE FINDING] Die Bedeutung des binocularen Wettstreites für die stereoskopische Entfernungsmessung. — Albrecht von Graefes Archiv für Ophthalmologie (Berlin), 153: 57-82. 1952. In German. DNLM

The role of "binocular rivalry" in depth perception is investigated. The "struggle for the visual field" greatly determines the capacity of judging distances; however, there are individual differences. Dominance of one eye is frequent.

1534

Handford, S. W., 1953
T. E. Cone, and S. C. Gover
A SHIP'S MOTION AND THE INCIDENCE OF SEASICKNESS. — Military Surgeon, 113 (3): 157-167. 1953. DLC (RD1.A7, v. 113)

Same as the report, Handford, S. W., 1952.

1535

Hardy, A. V., 1953
J. J. Spencer, J. E. Lett, and R. B. Mitchell
OTITIS EXTERNA. XI. PRELIMINARY STUDIES ON RESPONSE OF EXTERNAL EAR INFECTIONS TO SELECTED THERAPEUTIC AGENTS. — Florida State Board of Health, Bureau of Laboratories, Jacksonville, Fla. (Contract AF 33(038)-12465); and School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. iii+2 p. (Project no. 21-1401-0005, Report no. 11). AD 25 828(a) PB 113267

On the basis of bacteriologic findings, the response of Pseudomonas infections to the therapeutic agents employed revealed that in 64% of the ears treated with terramycin otic solution there was a change from numerous Pseudomonas organisms in the primary cultures to none on cultures taken after treatment. Comparable percentages obtained with polymyxin B, sodium sulfadiazine, and sulfamylon were 55, 35, and 18%, respectively, with a marked reduction in Pseudomonas organisms. On the basis of clinical records and without reference to the therapeutic agent employed, the response to treatment of 240 cases was classified clinically as good, fair, or poor. By this measure, the superior therapeutic agent seemed to be terramycin otic solution, followed by sodium sulfadiazine and sulfamylon. Preliminary results indicate that no single therapeutic agent used can be considered uniformly and highly satisfactory. Additional bacteriologic and more adequate clinical studies of therapeutic response are needed and are now being made. (Authors' summary and conclusions)

1536

Hardy, H. C. 1952
PRELIMINARY ESTIMATE OF A HEARING DAMAGE RISK CRITERION FOR STEADY-STATE NOISE. — Jour. Acoust. Soc. America, 24 (4): 446. 1952. DLC (QC221.A4, v. 24)

Abstract of a paper presented at the 43rd Meeting of the Acoustical Society of America, held at New York, N. Y., May 8-10, 1952:

"It is possible to get a simple hearing damage risk criterion, if one makes the following assumptions: (1) that hearing damage for those who work in noisy environment is a progressive auditory fatigue phenomenon, (2) that the fatigue is the same function of the stimulus in the inner ear for all frequencies, and (3) the sensation level is a similar function of the stimulus in the inner ear for all frequencies. The damage is, on this hypothesis, simply a function of the sensation level and varies with frequency in the same manner. This analysis leads to the setting up of equal loudness contours for broad-band noise which correspond to hearing damage contours. Such curves explain for the first time the 4000 c.p.s. 'notch' in the audiograms of industrial workers. Research data taken from a survey of industrial noise serve to establish two octave band curves which tentatively appear to bracket the region for damage risk for daily exposure over many years to a steady state noise environment. When the noise exceeds 100 sones in any octave band, long exposure definitely appears to be damaging. When the noise does not exceed 50 sones in any octave band, there appears to be very little danger of hearing damage even after many years of working day exposure."

1537

Hardy, H. C. 1952a
TENTATIVE ESTIMATE OF A HEARING DAMAGE RISK CRITERION FOR STEADY-STATE NOISE. — Jour. Acoust. Soc. America, 24 (6): 756-761. 1952. DLC (QC221. A4, v. 24)

The probable shape of a limiting spectrum for noise in a working environment where there is long daily exposure is determined by reasoning from previously determined data of the hearing mechanism. It is assumed that hearing loss is due to a progressive fatigue phenomenon, the fatigue being a direct function of the energy stimulus in the inner ear. From the characteristics of this stimulus as a function of frequency, it is shown that the most sensitive region for loss is around 3000 c. p. s., the low frequencies being as much as 20 db. less sensitive than this region. The 4000 c. p. s. "notch" in audiograms of industrial workers is thereby explained. The limiting spectra are essentially equal-loudness contours for broadband noise when the noise spectrum is plotted in octave bands. Two limiting loudness curves and their corresponding spectra are tentatively suggested as damage risk criteria. If the noise exceeds 100 sones in any octave band, it appears very probable that long time daily exposure will result in hearing damage and in a frequency region slightly above the frequencies of maximum stimulus. If the sound does not exceed 50 sones in any octave band, it appears to be unlikely that damage will occur even with long exposure. These criteria are confirmed by the few literature references which have enough data to be used. The need for more research to test these conclusions is emphasized. (Author's summary)

1538

Harridge, W. H., 1953
and W. H. Cole
ALTITUDE EFFECTS ON INTRA-ABDOMINAL LESIONS. A. THE EFFECT OF ALTITUDE ON INDUCED E. COLI PERITONITIS IN MICE. — Univ. of Illinois. Coll. of Medicine, Urbana (Contract AF 33(038)-14306); issued by School of Aviation Medicine, Randolph Field, Tex. Jan. 1953 9 p. (Project no. 21-23-019, Report no. 5.)
AD 6125 PB 108695

Experimental methods for the study of the effect of altitude on Escherichia coli-induced peritonitis in mice are presented and the results interpreted. The mortality rate in 540 mice injected with a standard dose of E. coli and left at an altitude of 13,000 feet for 48 hours was 51.8%. The mortality rate in a similar number of mice injected with the same dose of E. coli and kept at the control altitude of 590 feet was 30%. This difference is highly significant statistically. The size of the challenge dose of E. coli is a determining factor in the mortality rate of mice, but is independent of altitude. No significant effect of sex on the mortality rates of mice was obtained at either challenge dose or either altitude. (Authors' summary)

1539

Harris, J. D. 1953
NOTES ON GROUP PURE TONE AUDIOMETRIC TECHNIQUES. — Naval Medical Research Lab., New London, Conn. Memorandum Report no. 53-6, April 14, 1953. 15 p. (Project no. NM 003 041. 21).
AD 24 345 UNCLASSIFIED

Material is presented indicating situations in which audiometry is needed, the type of audiometry for particular situations, and the equipment best suited for particular installations. Literature is reviewed with respect to the establishment and validation of a reliable group audiometric examination. Two methods of calibrating a group audiometer are described: (1) a psychophysical method, in which a group of normal ears serve as a transfer standard between the individual audiometer and the group setup, and (2) a physical method, wherein the group headphones are placed one by one upon a small cavity and the other end of the cavity is connected with a microphone which leads through an amplifier to an indicating meter. (AD abstract)

1540

Harris, J. D., 1953a
and A. I. Rawnsley
THE LOCUS OF SHORT DURATION AUDITORY FATIGUE OR "ADAPTATION". — Jour. Exper. Psychol., 46 (6): 457-461. 1953.
DLC (BF1. J6., v. 46)
Reprint issued also as: Naval Medical Research Lab., New London, Conn. Report no. 240 (vol. 13, no. 1), Jan. 22, 1954. (Project Report no. NM 003 041. 56. 01). AD 36 617 UNCLASSIFIED

A distinction has to be made between auditory fatigue and auditory "adaptation". In the case of fatigue the recruitment curve is a straight line, while in an adapted ear the resulting curve is one of deceleration (the so-called "asymptotic" type). A technique of binaural loudness balancing between one normal ear and the other ear undergoing a threshold shift was employed. A tone, 450 milliseconds in duration, was channeled into one ear, followed by a second tone of increased loudness (in pulses of 50 milliseconds duration), resulting in a rise of the threshold. A third tone of equal pulse length was then introduced into the unadapted ear and the subject was requested to match loudness of the tones received in both ears. Results of the binaural matches were plotted, and the deviation of the adaptation recruitment curves from the normal recruitment curve was demonstrated. It is assumed that in relating the recruitment curves to types of deafness, it will be possible to determine more precisely what tissues are involved in fatigue and adaptation phenomena.

1541

Harris, J. D. 1953b
RECOVERY CURVES AND EQUINOXIOUS EXPOSURES IN REVERSIBLE AUDITORY FATIGUE FOLLOWING STIMULATION UP TO 140 DB PLUS. — Laryngoscope, 63 (7): 660-673. 1953.
DNLM

Reprint issued also as: Naval Medical Research Lab., New London, Conn. Report no. 236 (vol. 12, no. 21), Nov. 22, 1953. (Project Report no. NM 003 041.34.05). AD 30 642 UNCLASSIFIED

Three subjects with normal hearing were exposed to pure-tone noises at a frequency of 750 cycles per second, at sound pressure levels varying from 120 to 140 decibels, and for times of exposure varying from 30 seconds to 15 minutes. The time of recovery to normal hearing thresholds was measured with the aid of an audiometer. The ratios of hearing loss and recovery time were plotted for each stimulus variation. In another set of curves, sound pressure levels and stimulus durations producing equally deletorious ("equinoxious") effects were plotted against each other. From the resulting curves hearing losses can be easily predicted.

1542

Harris, J. D., 1953c
H. L. Haines, and C. K. Myers
A HELMET-HELD BONE CONDUCTION VIBRATOR. — Laryngoscope, 63 (10): 998-1007. 1953. DNLM

Also issued as: Naval Medical Research Lab., New London, Conn. Report no. 238 (vol. 12, no. 23), Oct. 1953. (Project Report no. NM 003 041.21.10). AD 30 641

A Sonotone Model 21-308 bone conduction vibrator was mounted in a helmet, making it possible to adjust and standardize the position of the vibrator tip on the mastoid process of either side, the angle of thrust, and the applied force. It was hoped by this means to improve the interpretability of bone conduction audiometry, an extremely valuable clinical tool. Test-retest thresholds with the helmet and with the handheld vibrator were collected on experienced and inexperienced subjects, at six octaves from 256 through 8,192 cycles per second. The difference between successive thresholds was somewhat less with the helmet than without; furthermore, the helmet significantly reduced variance among thresholds repeated over extended periods. (From the authors' summary and conclusions)

1543

Harris, S., 1953
and Karl U. Smith
DIMENSIONAL ANALYSIS OF MOTION. V. AN ANALYTIC TEST OF PSYCHOMOTOR ABILITY. — Jour. Applied Psychol., 37 (2): 136-141. 1953. DLC (BF1.J55, v. 37)

A test, called the Analytic Reactometer, permits controlled variation and measurement of different bodily and space dimensions of motion which are involved in various types of motion patterns. Preliminary investigations employing the instrument have yielded the following general results: Critical sources of variation in performance in various motion patterns of the type studied are related to the manipulation and travel components of motion. Performances in different space dimensions of both manipulation and travel movements correlate highly with one another. The reliability of specific tests related to hands, planes, direction of travel, direction of manipulation, and complexity of the manipulation pattern in the general test situation described, typically exceeds +.80 for manipulation and +.75 for travel movements. The present test, and the principles behind it, provide one means of securing precise and analytical data for exact quantitative specification of motions and motion functions. (From the authors' summary)

1544

Hasbrook, A. H. 1953
CRASH SURVIVAL STUDY: NATIONAL AIRLINES DC-6 ACCIDENT AT ELIZABETH, N. J. ON FEBRUARY 11, 1952. — Cornell Univ. Medical Coll. Crash Injury Research, New York. Informative Accident Release no. 15, Oct. 1953. viii+65 p. AD 30 398 UNCLASSIFIED

Crash survival details of a 140 m.p.h. crash involving a Douglas DC-6 transport aircraft, in which 32 of the 59 passengers survived, are presented and analyzed. Information is given on impact speed and altitude, directions of principal impact force, kinematic behavior of the fuselage, damage to cabin and seats, and injuries sustained in relation to passenger location; photographs and diagrams are shown. Findings are discussed and recommendations are made relative to crash survival design in future transport aircraft. (Author's abstract)

1545

Hatch, T., 1953
K. M. Cook, and P. E. Palm
RESPIRATORY DEAD SPACE. — Jour. Applied Physiol., 5 (7): 341-347. 1953. DLC (QP1.J72, v. 5)

For the calculation of anatomical dead space one should use the average CO_2 concentration in the lung gas which is normally exhaled since this represents the gas mixture involved in active lung ventilation. This has been done in a series of 100 tests here reported. Exhaled air was collected in a series of equally-timed fractions by means of a partitioning valve synchronized with the breathing cycle which was controlled, in turn, by a mechanical respirator. Breathing frequency was fixed at 6, 12, 15, and 20 r.p.m. and the tidal volume ranged in the tests from 400 to 2500 cc. The average CO_2 concentration in the last 200 to 400 cc of the exhalation, after upper respiratory washout, is shown to represent the lung gas which is in active exchange with the outside atmosphere. For five subjects, the average anatomical dead space was found to be 130 cc. ($\sigma = \pm$ 30 cc.). This agrees well with the volume calculated from physical measurements of the respiratory tree. There was no apparent change in dead space volume with increasing tidal volume or with changes in breathing frequency. These results support the suggested separate measurement of anatomical dead space and indicate that a sizeable terminal fraction of normally exhaled air must be taken to represent the average CO_2 concentration in the actively ventilated portions of the lung. Neither the common forced-exhalation sample nor a small gas sample collected at the end of a normal exhalation will give meaningful values. (From the authors' summary)

1546

Haus, E., and H. Jungmann 1953
[CIRCULATORY REACTIONS DURING A SHORT CHANGE OF ALTITUDE IN THE ALPS] Kreislaufreaktionen bei kurzdauerndem Höhenwechsel in den Alpen. — Schweizerische medizinische Wochenschrift (Basel), 83 (48): 1156-1159. 1953. In German. DNLM

Circulatory changes were studied in 21 healthy subjects, 18-56 years of age, during a short mountain ascension (by bus and cable-car) in cloudy weather. Blood pressure and pulse rate were measured at 950, 1050, 1700, 2200, and again at 1050 and 950 m. altitude. Results show that an altitude change from 950 to 2200 m. induced a biphasic circulatory reaction: the first phase represents clearly a stimulation of the parasympathetic system; the second phase may be designated as amphotonia with predominance of sympathetic stimulation. In comparative barochamber tests, the first phase could not be observed; the second phase appeared only above 3000 m. simulated altitude. In one group which made the same ascension in sunny weather no increase in minute-volume (amphitonia) was observed at 2200 m., which seems to indicate that sunrays inhibit sympathetic stimulation.

1547

Hauty, G. T. 1953
PSYCHOLOGICAL ADAPTABILITY: STANDARDIZATION OF A PSYCHOMOTOR TEST AND CONSIDERATION OF TRANSFER EFFECTS. — School of Aviation Medicine, Randolph Field, Tex. Jan. 1953, 18p. (Project no. 21-0202-0005, Report no. 2). AD 3221 UNCLASSIFIED

One hundred twenty-eight right-handed, male, basic Air Force trainees were assigned to 8 different groups which permitted analysis of (1) differential difficulty of the 4 tasks made possible by the modification of the School of Aviation Medicine Self-Pacing Discrimination Reaction Time Test (CP611E), (2) effects of instruction upon proactive interference, and (3) differential motor transfer as a function of response similarity and response dissimilarity. Before the initial and transfer tasks, there were indicated to 4 of the groups all of the correct responses for all of the possible stimuli. The remaining 4 groups were told only that they were to learn the correct response for each of the stimuli. All groups were given eight 2-minute trials on their respective initial tasks, followed by a 10-minute rest and then eight 2-minute trials on their respective transfer tasks. Scoring was in terms of correct and incorrect responses. Conclusions derived are: (1) The four different tasks are not of equal difficulty. (2) The greater degree of directed attention and motivation which might be expected to occur when correct responses must be learned in contrast to the case where they are pointed out beforehand, may be considered as factors responsible in reducing effect of proactive interference. (3) The differential motor transfer attributable to the similarity-dissimilarity of response members suggests that with identical stimulus members, negative transfer is more likely to occur when the motor response members are dissimilar. (From the author's summary and conclusions)

1548

Hauty, G. T. 1953a
PSYCHOLOGICAL ADAPTABILITY: INVESTIGATION OF MIRROR VISION PERFORMANCE. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+7 p. (Project no. 21-0202-0005, Report no. 4). AD 19 691 PB 112154

A simple perceptual-motor task performed with the use of mirror vision was learned by 100 right-handed, male, basic Air Force trainees divided into four different groups which permitted analysis of performances of the preferred and nonpreferred hands and the effects of clockwise and counter-clockwise direction of movement. Following a short rest, the four groups learned a transfer task which involved the opposite direction of movement for each group and the use of the opposite hand for two of the groups. All groups were given twelve 1-minute trials of initial learning, a 10-minute rest, and twelve 1-minute trials of transfer learning. Scoring was in terms of time on target and time in error which were electrically recorded. In initial learning, the absence of significant differences indicates that the preferred and nonpreferred hands perform with nearly equal efficiency which is unaffected by direction of movement. In the early period of transfer learning, the nonpreferred hand was significantly superior. These significant differences, with one exception, were not maintained throughout the remaining trials. Differences between unilateral and bilateral transfer were not significant for either hand. (From the author's summary)

1549

Hauty, G. T. 1953b
METHODS FOR THE MITIGATION OF WORK DECREMENT. — School of Aviation Medicine, Randolph Field, Tex. Dec. 1953. iii+14 p. (Project no. 21-1601-0004). AD 29 372 UNCLASSIFIED

One hundred and sixty-eight male basic airmen volunteers, whose ages ranged narrowly around 20 years, were given preliminary training on a compensatory pursuit task involving simulated aircraft instruments and controls. They then performed the task for 7 hours after having been randomly assigned to the 42 combinations of 7 pharmacological conditions, 3 systems of presenting information concerning performance adequacy, and 2 differing proximities of goal. At the conclusion of this period, the subjects performed a dissimilar perceptual-motor task for 16 minutes. Transferability of work impairment was appraised. Conclusions: (1) D-amphetamine (5 mg.) effectively mitigated work decrement for the entire period of 7 hours. A caffeine derivative was also effective but for a shorter period of time. The addition of d-amphetamine (5 mg.) to a preparation of diphenhydramine hydrochloride (50 mg.) and scopolamine (0.65 mg.) had the desired effect of reducing but

not eliminating the effects of sedation upon performance. (2) The greater efficiency of perceptual behavior afforded by supplementary signals resulted in a superiority of work proficiency which was sustained for the 7 hours of work. (3) The beneficial effects of an intermediate goal were likewise seen to result in superior work proficiency throughout the 7-hour period. (4) Performance effects were not transferred from the prolonged task to the dissimilar terminal task. (From the author's summary and conclusions)

1550

Hauty, G. T., and G. R. Wendt 1953c
STUDIES OF VESTIBULAR FUNCTION. I. THE DURATION OF PRIMARY NYSTAGMUS AS A FUNCTION OF SPEED OF ROTATION AND OF ACCELERATION. — Jour. Psychol., 36 (1): 143-151. 1953. DLC (BF1.J67, v. 36)

The relation of the duration of primary ocular nystagmus in man to speed of rotation and to rate of angular acceleration is discussed. A subject was seated on a platform (which could be rotated up to 180° per second), with the head fixed at a forward tilt of about 15°. The vertical axis of the head was coinciding with the rotation axis. The room was completely dark, and the subject looked at a fixation point (a collimated star) while giving verbal reports on the turning or cessation of the oculogyral movement. In the first part of the experiment, each of 3 subjects was stimulated six times by acceleration to or from each of five speeds of rotation (11°, 22°, 45°, and 180° per second) with duration of acceleration constant at about ½ second. It was found that the duration of nystagmus was probably constant (mean durations were 28, 25, 27, 28, and 27 seconds respectively). In the second part of the experiment, when the period of acceleration was lengthened, the primary nystagmus was also lengthened. With a mixed speed of 180° per second, and a duration of the acceleration of 5 and 85 seconds, the nystagmus lasted 27, 29, and 87 seconds respectively. In the latter case the primary nystagmus ended and was replaced by the secondary inverse nystagmus while the subject was still accelerated.

1551

Hawthorne, R. 1953
ARE AFT FACING SEATS SAFER? — Aviation Age, 20 (4): 32-43. 1953.
DLC (TL501.A8187, v. 20)

This is a general discussion of a number of transport airplane accidents, with emphasis placed upon the importance of the strength of the passenger seat structures and their position in a crashing plane. It is obvious, from the evidence collected by Crash Injury Research of Cornell Medical College, that the question of aft-facing seats in opposition to forward-facing seats has not been satisfactorily answered with regard to passenger protection. The author points out that many times forces are acting in several directions during a plane crash, not just in a forward to rear direction. One question, however, has been answered during these investigations: whether or not safety belts are aids or hazards. With the exception of less than 1%, passengers surviving these crashes were definitely given substantial protection by the restraining action of the seat belts.

1552

Haynes, B. C. 1953
FINAL APPROACH VISIBILITY STUDIES: FISCAL YEAR 1952. — Weather Bureau, Washington, D. C. Progress Report, Part 2, March 1953. vi+53 p.; issued by Air Navigation Development Board, Washington, D. C. (Project no. 4.14).
AD 9775 UNCLASSIFIED

The objectives of the visibility phase of this project were to undertake a field calibration of a transmissometer developed by C. A. Douglas and L. L. Young (Civil Aeronautics Administration, Washington, D. C., Technical Development Report no. 47, Feb. 1945), and to compare visibility reported by an observer at the end of the runway with visibility determined by a nearby transmissometer. An attempt was made to select dark target objects (houses, trees, etc.) against a sky horizon background. A target clarity code was devised, consisting of five stages, from "barely detectable" to "prominent". On the basis of the findings, it was concluded that a contrast threshold value of .055 may be accepted for visibilities of three miles or less in fog, a value that corresponds closely to the calibration of Douglas' transmissometer. Determinations of illuminance threshold at night as compared with transmissometer calibration, likewise led to the acceptance of the latter. In view of the comparatively few measurements carried out, the statistical validity of the experiments is questionable.

1553

Hazard, D. M. 1953
AIRCRAFT ENGINE NOISE CONTROL AS VIEWED BY THE ENGINE MANUFACTURER. — Jour. Acoust. Soc. America, 25 (3): 412-416. 1953. DLC (QC221.A4, v. 25)

Presented in this paper is a review of the overall control procedure including typical noise sources, control objectives, recent techniques used in the control and attenuation of aircraft powerplant noise, problems associated with the design of noise control provisions, and limitations in the existing methods. This review includes data on reciprocating, turbojet, turboprop, and ram jet powerplants along with a description of installations used for controlling the noise both in ducted exhaust systems and in propeller-type test cells. This discussion cites cost, space, and high tolerance in design factors as being the major design problems. Areas of continued endeavor are outlined for the engine manufacturer, acoustical consultant, and the noise control equipment manufacturer. (From the author's summary)

1554

Hecht, K. F. 1953
GROUND TESTS OF A PILOT EJECTION SEAT EJECTED THROUGH MONOLITHIC-, REINFORCED-MONOLITHIC-, AND LAMINATED-TYPE CANOPIES. — Wright Air Development Center. Aircraft Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-361, Oct. 1953. v+20 p. (RDO no. 453-312). AD 36 306 UNCLASSIFIED

Five tests were conducted by the Aircraft Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, during the latter half of 1951 to determine the feasibility of ejecting pilots through canopies in the event of a canopy release failure. For three of the tests, the ejection seat and dummy were fired through a monolithic-type canopy used on the F-86A aircraft; the remaining two tests were through an F-84 reinforced monolithic-type canopy and a B-47 laminated-type canopy. Ejections were accomplished by duplicating the mechanisms involved in actual flight. Motion picture cameras and metering devices recorded the data. The results of the tests indicate that the trajectory of the seat and pilot after ejection through the canopy is not seriously affected and adequate tail clearance will still be attained. (Author's abstract)

1555

Hecht, K. F., 1953a
E. G. Sperry, and F. J. Beaupre
DOWNWARD CREW EJECTION SEAT TESTS FROM THE B-47B AIRPLANE. — Wright Air Development Center. Aero Medical, Aircraft, and Equipment Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-443, Nov. 1953. viii+79p. (RDO nos. 453-312D and 695-61). AD 63 501 UNCLASSIFIED

Flight-test ejections of the downward ejection seat from a B-47B airplane are described. A total of twenty-three ejections were accomplished; sixteen dummy-subject tests were conducted at Wright-Patterson Air Force Base from 17 July 1953 to 29 September 1953, and seven human subject tests were conducted at Eglin Air Force Base from 7 October 1953 to 21 October 1953. Test results obtained by analysis of motion-picture records and subjective reactions of the human subjects are presented. It is concluded that the downward ejection seat is acceptable as an escape device for use in the B-47 airplane if provisions for automatic separation and parachute deployment are included for the crewman. It is recommended that further studies be made of the firing control method utilized for downward ejection seats to improve the ability of the crewman to retain his grip. It is further recommended that design consideration be given to the mechanical retention of the limbs during very high airspeed ejections. (Authors' abstract)

1556

Heinsius, E. 1952
[A NEW COLOR LANTERN FOR THE TESTING OF DEFICIENCIES IN COLOR VISION] Über eine neue Farblaterne zur Untersuchung von Farbenfehlsichtigkeit. — Klinische Monatsblätter für Augenheilkunde (Stuttgart), 120 (1): 86-89. 1952. In German. DNLM

A color lantern employed in color vision tests should respond to the following requirements: it should be adaptable to small visual angles, various light intensities, and various degrees of saturation; and it should have shutter devices to produce short light flashes to allow for presentation of simultaneous comparative images. --- Following a brief survey of some well-known lantern tests, a model devised by the author is described which satisfies all the above requirements. The device can be applied to carry out tests with lights of any desired color. It enables the examiner to clearly determine the degree of color vision deficiencies, even in border-line cases.

1557

Helson, H. 1953
PSYCHIATRIC SCREENING OF FLYING PERSONNEL: PERCEPTION AND PERSONALITY — A CRITIQUE OF RECENT EXPERIMENTAL LITERATURE. — School of Aviation Medicine, Randolph Field, Tex. July 1953. v+55 p. (Project no. 21-0202-0007, Report no. 1). AD 19 669 PB 110973

A wide range of scientific literature is reviewed, collated, and evaluated critically under the following major rubrics: perception of self and social perception, subception or discrimination below thresholds of awareness, altered perception in deviant personalities and in normal personalities under specific conditions, sex differences in perception, the relation of perceptual behavior to intelligence, and inner determinants of perception. A general theory of perceptual processes, based on the author's adaptation-level frame of reference, is presented, with a quantitative formulation of the adaptation-level concept and applications to experimental and clinical data. Perceptual tests of anxiety states are reviewed and perceptual approaches to the study of anxiety, with particular reference to psychiatric screening of flying personnel, are critically presented. (Author's summary)
191 references.

1558

Hemphill, J. K., 1952c
and L. B. Sechrest
A COMPARISON OF THREE CRITERIA OF AIRCREW EFFECTIVENESS IN COMBAT OVER KOREA. — Amer. Psychologist, 7 (7): 391. 1952. DLC (BF1.A55, v. 7)

A condensation of the report, Hemphill, J. K., 1952b.

1559

Hemphill, J. K., 1952d
and L. B. Sechrest
A COMPARISON OF THREE CRITERIA OF AIRCREW EFFECTIVENESS IN COMBAT OVER

KOREA. — Jour. Applied Psychol., 36 (5): 323-327. 1952. DLC (BF1.J55, v. 36)

Same as the paper, Hemphill, J. K., 1952b.

1560

Henry A. F., 1953
and E. F. Borgatta
A REPORT ON ATTITUDES TOWARD DESERTION OF AIR FORCE PERSONNEL. — Harvard Univ. Lab. of Social Relations, Cambridge, Mass. (Contract AF 33(038)-12782); issued by Human Resources Research Inst., Maxwell Air Force Base, Ala. Research Memorandum no. 8, May 1953. ii+9 p. AD 18 115 PB 117983

Attitudes toward punishment of airmen guilty of desertion were obtained from questionnaires administered to (1) 2300 commissioned officers at 17 air bases of the Strategic Air Command (SAC), Eastern Air Defense Force, and USAF in Europe and (2) 1000 airmen at 5 SAC bases. The officers showed a significantly greater tendency to recommend clemency and psychiatric treatment than did the airmen. The difference persisted when only SAC personnel were compared. No significant difference pertaining to leniency recommendations occurred between the officers of the three commands. (AD abstract)

1561

Henry, F. M. 1952
THE AEROEMBOLISM PROBLEM FOR LONG-RANGE MISSIONS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-84, Feb. 1952. iv+21p. (RDO no. 696-61). ATI 171 459 UNCLASSIFIED

It can be anticipated that cabin pressure differential will be lost in a significant proportion of high-altitude, long-range bombing operations. In such circumstances, it may be necessary to maintain as high an altitude as is consistent with the limitations imposed by the tendency of personnel to develop incapacitating bends, chokes, or other grave symptoms of decompression sickness (aeroembolism). By breathing undiluted oxygen for several hours under special discipline during the early phase of the flight, at cabin altitudes of the order of 10,000 to 15,000 feet, it is possible to almost completely avoid serious aeroembolism symptoms in later phases that may require cabin altitudes of the order of 35,000 to 38,000 feet, and would otherwise result in 15 to 30% incapacitation. It is shown that the problem becomes particularly acute if all members of the air crew are essential to the mission or to a successful return. Alternative methods of dealing with the situation are considered briefly. (Author's abstract)

1562

Henry, F. M. 1953
THE EQUIVALENT "BENDS" ALTITUDE OF THE T-1 PARTIAL PRESSURE SUIT. — Univ. of California, Berkeley (Contract AF 18(600)-20); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-276, June 1953. iii+8 p. (RDO no. 696-61). AD 16 912 UNCLASSIFIED

The equivalent aviator's "bends" altitude of the T-1 partial pressure suit has been determined by obtaining the critical altitude for appearance and disappearance of pre-established bends pains of various intensities. This was done by lowering and raising the decompression chamber altitude with the men wearing the unpressurized suit, and then by holding the chamber at a constant high altitude while the pain was relieved and caused to return by pressurizing and depressurizing the capstans of the suit. The experiments were performed in the altitude chamber of the University of California (Berkeley). In 33 man-runs on 17 men, the equivalent altitude of the suit averaged 1500 feet lower than the direct altitude chamber figure. A third of the cases showed no difference. The critical altitude for pre-established bends was 24,700 feet for mild and 31,400 ft. for moderately severe pains. A table is presented to show the probability of relieving bends pain with the T-1 suit. The average case of bends would be reduced to a tolerable intensity with 14 p.s.i. on the capstans at 48,000 feet cabin altitude. Wrist and ankle pains were relieved as effectively as shoulder, elbow, and knee pains. (Author's abstract)

1563

Hertzman, A. B., 1952
W. C. Randall, C. N. Peiss, and R. Seckendorf
REGIONAL RATES OF EVAPORATION FROM THE SKIN AT VARIOUS ENVIRONMENTAL TEMPERATURES. — Jour. Applied Physiol., 5 (4): 153-161. 1952. DLC (QP1.J72, v. 5)

The rates of evaporation of water from the skin of the face, hand, foot, arm, leg, and trunk were separately measured by the desiccating-capsule technique, in resting nude subjects who were exposed to environmental temperatures in the range of 24° to 38°C. At temperatures below the sweating thresholds, insensible perspiration proceeded at a fairly uniform rate (6-10 g./m.^{2}/ hr.) from the skin of the arm, leg, and trunk. Palmar, plantar, and facial rates were higher (up to 100 g./m.^{2}/hr.) for the palm. The onset of sweating occurred in the various skin regions at different environmental temperatures, thus implying a recruitment of sweating which ascended from the distal portion of the extremities to the higher levels of the body as the evaporative demands increased. The possible mechanisms of this phenomenon are discussed. The regional fractions of the total cutaneous evaporation demonstrated domination of evaporative regulation by the legs at temperatures slightly above the sweating thresholds. At temperatures above 34°C., increases in sweating were linear with the rise in temperature and about equal over the body surface. The continued domination of evaporative heat losses by the leg and trunk resulted from the mass effect of their extensive surfaces. (Authors' summary)

1564

Hertzman, A. B., 1953
W. C. Randall, and C. N. Peiss
THE EFFECTS OF AMBIENT TEMPERATURE AND AIR HUMIDITY ON THE REGIONAL RATES OF SWEATING. — St. Louis Univ. School of

Medicine, Mo. (Contract AF 18(600)-96); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. AF Technical Report no. 6680, Part 11, Jan. 1953. ix+69 p. (RDO no. 696-69). AD 12 719
PB 122826

The regional sweating responses of resting nude young males were recorded by the desiccating capsule and iodine-starch paper techniques when the subjects were exposed to the following environmental conditions: (a) a rising ambient temperature, initially about 26°-33°C., increasing at a rate of about 0.1°C. per minute to about 41°C., with humidity rising also to either "high" or "moderate" levels; (b) a relatively constant ambient temperature, about 39°-42°C., with humidity either "high" or "low". Sweating was recorded continuously from as many as twenty different areas of the body surface during experimental periods of two to three hours. The total sweat output of the subject was estimated from weighting of the regional sweat rates and from weight losses. These two estimates agreed well at high rates. The lower extremity dominated sweating at the lower ambient temperatures. With increase in the latter, the sweating rates increased relatively more on certain areas of the trunk and upper extremity. This effect, particularly noticeable at high ambient temperature and high humidity, suggested that intense stimulation of the sudomotor system (by rise in core temperature) results in a relatively more intense discharge to the higher spinal neurones which presumably supply the back of the neck, the back, chest, arm, and forehead. (From the authors' abstract)

1565

Hertzman, A. B., 1953a
W. C. Randall, C. N. Peiss, and J. G. Adams
CUTANEOUS THERMOSENSORY RECRUITMENT OF SWEATING. — St. Louis Univ. School of Medicine, Mo. (Contract AF 18(600)-96); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. AF Technical Report no. 6680, Part 13, Dec. 1953. vi+17 p. (RDO no. 696-69). AD 27 681
PB 114176

The effect of sudden changes in ambient temperature (and of local heating or cooling) on sweating on the forehead, trunk, arm, and leg were recorded by the desiccating-capsule and sweat-print techniques. Capsular samples of sweating were taken sequentially every three minutes, sweat prints every thirty seconds. Transition to a hot environment (40°-45°C) was followed by an immediate burst (within thirty seconds) of sweat discharges on all skin areas under observation; a corresponding increase in sweating was indicated by the capsules. Transition to less hot environment (32°-35°C) was also followed at once by increases in sweating but the responses were less intense than in the hotter environment. Palmar sweating, although erratic, tended to proceed in the direction opposite to that of thermoregulatory sweating in other skin areas. Heating or cooling of the hand elicited at once increases or decreases in thermoregulatory sweating on other skin areas. These responses preceded any detectable changes in axillary or oral temperatures. They, therefore, are probably not due to a direct effect of temperature on the hypothalamic centers. (From the authors' abstract)

1566

Heyck, H., 1952
and W. Höpker
[CHANGES EFFECTED IN THE RAT BRAIN BY ULTRASOUND] Hirnveränderungen bei der Ratte durch Ultraschall. — Monatsschrift für Psychiatrie und Neurologie (Basel), 123 (1): 42-64. 1952. In German. DNLM

The brains of 40 living rats were subjected to ultrasonic vibrations, at frequencies of 175,000, 800,000, and 1,200,000 c.p.s., and at increasing intensities (1 to 3 watt/cm^2) and durations of application (30 sec. to 6 min.). A direct thermal influence on the animal's head was avoided. Histological examination after the experiment showed that applications of 175,000 c.p.s. at 3 watt/cm^2, or 800,000 c.p.s. at 1 watt/cm^2, induced a diffused shrinkage of the more sensible ganglial cells and hyperchromatism of the nuclei; these changes were reversible after a few days. Application of 1,200,000 c.p.s. (i.e., a dosage which still corresponds to that of normal therapeutic application) induced permanent damage more rapidly: at 1 watt/cm^2 the changes were still reversible; at 2 watt/cm^2, even a short application induced general shrinkage of the large lower pyramids, as well as of the small pyramids in the second layer, with localized foci at various depths; at a later stage, swelling appeared, followed by the formation of large vacuoles and, finally, pyknosis, and cell destruction. Thus, the anatomical changes are determined by two factors: (1) the duration of application and the dose applied, (2) the inherent differential sensibility of the cells. It is concluded that the damage by ultrasound waves is caused not so much by pressure variations as by the absorption of the waves and consequent local rise in temperature.

1567

Hick, W. E. 1952
WHY THE HUMAN OPERATOR? — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 181/52, 1952. 17 p. AD 12 232 UNCLASSIFIED

The powers and limitations of the human operator are discussed as a communication channel in the performance of a given function. Skill is considered largely a function of the amount of information transmitted, which is proportional to the reaction time of the operator. In verbal reproduction and other imitative behavior, efficient coding of the information may explain the high transmission rates. Although the total output capacity of the sensory and motor systems is large, the limitations of the brain allow selection of only

10 to 15 bits/second with an average of 5 to 6 bits/second. The hypothesis is advanced that information is perceived in the form which is easiest to describe. (AD abstract)

1568

Hick, W. E. 1953
PRE-FLYING PERCEPTUO-MOTOR TRAINING OF PUPIL PILOTS. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 832(a), May 1953. 4 p. AD 41 108
UNCLASSIFIED

General principles of carrying out an effective pilot training program are discussed. Such a program should be based on the following factors: (1) a suitable choice of component tasks; (2) proper order of such tasks, earlier ones being dropped out as later ones are introduced; and (3) training on each task until it is carried out automatically and can be kept up for a considerable time. Simulated flight is only a poor substitute for "the real thing"; for it can be generally stated that negative transfer occurs between tasks which are superficially similar but possess serious hidden differences. Hence it would be advisable to simplify the simulated tasks to the point where, what little they do simulate, corresponds exactly to actual conditions. The author advances a number of specific suggestions regarding pre-flight training devices and methods. Judgment of height should be practiced on preferably colored aerial photographs of various types of terrain, taken from various heights and angles, emphasis being on quick interpretation. Movie films should be employed to teach estimation of touchdown points in landing and proper climbs and descents. To convey the proper "feel" of controls, magnified dummy displays should be used, the complexity of which should increase with the progress of training. A sympathetic and positive attitude of the instructor toward simulated training methods is essential for their success.

1569

Hick, W. E. 1953a
SKILL AND THE AIRMAN. — In: The biology of flying, p. 8-10. Aeronautical Research Council (Gt. Brit.). Engineering Physics Subcommittee, London. Report no. E. P. 240, May 21, 1953. AD 23 124 UNCLASSIFIED
Also published in: Advancement of Science (London), 9 (36): 381-383. 1953. DLC (Q41.B812, v. 9)

In order to arrive at a complete and exact evaluation of the man-machine relationship, the aviation designer of today is searching for a mathematical formulation of relevant pilot functions. Two mathematical techniques have been employed — the theory of cyclic systems (servo-mechanisms) and the theory of information and communication. The pilot's output is considered a set of independently varying muscular forces applied to various controls; the effects of these forces pass through the aircraft and are fed back to the pilot's sense organs after passing through the aircraft and its instruments. A mathematical formula expressing such a process is given. Though essentially probabilistic, in that it deals with frequencies of errors and of random fluctuations, such formulation provides the psychologist with a rational basis for combining measures of accuracy and speed of performance.

1570

Hickam, J. B., 1953
J. F. Schieve, and W. P. Wilson
THE RELATION BETWEEN RETINAL AND CEREBRAL VASCULAR REACTIVITY IN NORMAL AND ARTERIOSCLEROTIC SUBJECTS: — Aug. 1953. iii+3 p. Duke Univ. School of Medicine, Durham, N. C. (Contract AF 33(038)-27878); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-1601-0014, Report no. 2). AD 19 667 UNCLASSIFIED

(1) Parallel measurements of retinal arterial reactivity to oxygen, on the one hand, and cerebral blood flow and cerebral vascular reactivity to carbon dioxide, on the other, have been made in normal and arteriosclerotic subjects. — (2) Retinal arterial reactivity is significantly correlated with cerebral flow and reactivity. — (3) This finding is taken to mean that arteriosclerosis servere enough to affect measurements of this sort is apt to involve retinal and cerebral vessels together. There are definite exceptions to this generalization. (Authors' abstract)

1571

Hidera, G. J. 1953
PREDICTIVE DIAGNOSIS. — Aeronaut. Eng. Rev., 12 (3): 31, 48. 1953.
DLC (TL501. A326, v. 12)

Comments presented at the Air Safety Seminar of the Flight Safety Foundation, Inc., (held at Bermuda, Nov. 19-21, 1952) are summarized. In addition to curing illnesses or injuries of flying personnel, the scope of aviation medicine has been enlarged to include pre-clinical diagnoses of abnormalities so that corrective measures may be taken before the symptoms of diseases appear. To achieve this goal constant observation of the individual must be maintained with the hope that any physiological or psychological deviation from the normal pattern may give an indication of incipient disease.

1572

Hillman, B. 1953
REPORT ON TESTING AND EVALUATION OF BAUSCH AND LOMB NEUTRAL N-15 SUNGLASSES. — Naval Medical Research Lab., New London, Conn. Memorandum Report 53-3, March 5, 1953. 4 p. (Project no. NM 003 041.51).
AD 13 041 UNCLASSIFIED

A sample lens of the Bausch and Lomb N-15 sunglasses was given a battery of tests. The glass was found to meet all requirements for general purpose sunglasses recommended by this laboratory. The spectrophotometric transmittance curve and the Judd average deviation index show that the lenses used in these glasses are very nearly flat neutral, thus insuring daylight duplication of colors. The

high absorption of heat radiation is especially desirable in many naval and air situations. (Author's summary)

1573

Hirsh, I. J., 1952b
and W. D. Bowman
MASKING OF SPEECH BY BANDS OF NOISE. — Jour. Acoust. Soc. America., 25 (6): 1175-1180. 1952. DLC (QC221.A4, v. 25)

The threshold of intelligibility for two-syllable words was measured in the presence of different levels of masking noise. Twelve different bands were used, one (20-6600 c.p.s.) approximating a white noise and the other 11 containing a band of frequencies corresponding to a pitch interval of 250 mels. The absolute thresholds for these bands were also measured to permit transformation of the noise level from an absolute scale to a scale of sensation level. The results show a linear relationship between the masked threshold and noise level for white noise and for bands of noise between 394 and 1420 c.p.s. For noise bands above 1420 c.p.s., the masking function is accelerated, while the two bands below 394 c.p.s. yield sigmoid masking functions. The most effective band contained frequencies between 670 and 1000 c.p.s. The signal-to-noise ratio at threshold for this band was about -25 db. while for bands above or below, it was smaller, reaching a minimum of -60 db. for the highest and lowest bands. White noise was more effective than any band, giving a threshold S/N ratio of -15 db. (Authors' summary, modified)

1574

Hitchcock, F. A., 1952
S. A. Frye, and J. P. Kemph
CIRCULATORY ARREST IN DOGS FOLLOWING EXPLOSIVE DECOMPRESSION TO 30 mm. Hg. — Federation Proceedings 11 (1[I]): 71. 1952. DLC (QH301.F37, v. 11)

In an effort to determine the time at which circulatory arrest occurs, 10 dogs were explosively decompressed to 30 mm. Hg, and immediately after the decompression diodrast was injected into the external jugular vein and angiocardiograms were made at intervals of from 2-7 seconds for 24 seconds or longer. The circulation through the right heart, pulmonary vessels, left heart, and aorta could be followed in this manner. Results showed that circulatory arrest occurred within 16 seconds in all dogs and within 10 seconds in 6 of the 10 animals. Eight of the dogs had gas in the heart within 10 seconds, and in one other gas was found in 16 seconds. The diodrast usually went no further than the right heart, although occasionally it was seen in the pulmonary veins or in the aorta and its branches. These data indicate that usually circulatory arrest which results from the formation of gas in the cardiovascular system occurs within 16 seconds after explosive decompression to 30 mm. Hg. Records of arterial blood pressure, however, indicate that occasionally such circulatory arrest does not occur until a minute or more after explosive decompression. In such cases the circulatory collapse is probably due to anoxia. (From the authors' abstract)

1575

Hitchcock, F. A., 1953
and J. P. Kemph
PROGRESS REPORT ON THE SEELER VALVE. — In: Chem. Corps Med. Labs., Conference on artificial respiration, p. 52-53. Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19, April 1953. AD 9582 PB 109598

Research on the Seeler Resuscitator Valve is summarized: (1) The valve has been repeatedly sterilized at a temperature of 250° F. and 15 p. s. i. (2) In a long series of experiments carried out on dogs exposed to various simulated conditions it was noted that the valve was instrumental in breaking through bronchial constriction with positive pressures ranging from 10 to 65 mm. Hg; in a state of shock and in experiments involving pulmonary edema, alternating positive-negative manual controlling (push-pull resuscitation) tended to correct the conditions. (3) The valve has been also successfully used in surgical cases in man, mostly under relatively high pressures (12 mm. Hg or above). The lowest pressure range used in the experiments was +12 and -2 mm. Hg.

1576

Hitchcock, F. A. 1953a
GASEOUS EXCHANGES IN THE PULMONARY ALVEOLI. — Ohio State Univ. Research Foundation, Columbus. Final Report (for Jan. 1, 1947-Aug. 31, 1952), June 15, 1953. 11 p. (Contract N6onr-225, Task Order 8). AD 14 084 UNCLASSIFIED

Experiments on respiration, using a mass spectrometer (MS), showed that the equilibrium in the lung alveoli is completely established by the time the last of the expanding air has escaped from the lung. When the composition of the air is suddenly changed, the time required for the establishment of the new equilibrium depends upon the rapidity with which the lungs are ventilated with air of different composition. This usually requires about ten complete respiratory cycles. Continuous analysis of the expired air indicates that the pCO_2 (the partial pressure of CO_2) rises more rapidly than the pO_2 falls. A study of similar variations in pulmonary venous blood in dogs under artificial respiration indicated that the CO_2 content was higher just before the beginning of deflation than it was immediately following inflation. An MS determination of respiratory dead space was attempted in which human subjects breathed normally while at rest, hyperventilated voluntarily, and exercised violently on the bicycle ergometer. The MS method gave slightly lower values than the conventional method because the MS measures the volume of air which is unmixed with alveolar air. (AD abstract)

1577

Hitchcock, F. A., 1953b
W. V. Whitehorn, and A. Edelmann

TOLERANCE OF NORMAL MEN TO EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression ..., p. 1-12. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(a)
UNCLASSIFIED

This is a reprint of a paper which appeared in the Jour. Applied Physiol., 1 (6): 418-429, 1948. The effects of explosive decompression on the occurrence and susceptibility to decompression sickness was studied in a large decompression chamber representing the ambient atmosphere, while a smaller chamber within simulated the pressurized aircraft. In more than 500 experiments on 150 subjects, explosive decompression at rates as fast as 1300 mm. Hg/second and over ranges of more than half an atmosphere caused no apparent ill effects. Electrocardiograms taken during explosive decompression showed no significant changes and there was no difference between chest X-rays and audiograms taken before and after a series of explosive decompressions. No evidence of bubble formation following explosive decompression was noted. There was a slightly higher incidence of incapacitating bends and chokes following explosive decompression, but this effect is easily masked by other bends-producing factors (e.g. exercise, increased altitude). Explosive decompression exerted no significant effect on the ability of subjects to tolerate an altitude of 45,000 feet with pressure breathing. It is concluded that explosive decompression, within the rates and ranges used in these experiments, does not constitute a serious hazard to normal human beings. (From the authors' results and summary)

1578

Hitchcock, F. A., 1953c
J. F. Atkinson, and J. P. Kemph
BLOOD OF DOGS FOLLOWING CONTROLLED BREATHING OF AIR AND OXYGEN. — Federation Proceedings, 12 (1[I]): 68. 1953.
DLC (QH301.F37, v. 12)

Mongrel dogs were injected with sodium nembutal in the peritoneum, thus having spontaneous respiration paralyzed. Artificial respiration was applied for consecutive periods of 1 hour on air and oxygen. At the end of each period, CO_2 and O_2 content, hematocrit, and pH measurements were made on both mixed venous (taken from right heart) and arterial blood. O_2 capacity and CO_2 combining power were determined on all samples of arterial blood. A comparison of results with those obtained from the same dogs after being anesthetized, but before spontaneous breathing stopped, justify the following conclusions: on beginning artificial respiration whether on air or oxygen, both arterial and venous CO_2 decreased while both O_2 and CO_2 A-V differences increased. Arterial O_2 increased when O_2 was inspired. When animals were changed from air to O_2, the venous CO_2 and arterial O_2 increased while the CO_2 combining power and venous pH fell. Following change from O_2 to air, arterial CO_2 and O_2, and venous O_2 and CO_2 combining power, decreased while O_2 and CO_2 A-V differences and arterial and venous pH increased. No significant changes were noted during 2 hours of continuous air breathing while 2 hours of O_2 administration resulted in an increase in venous CO_2. Apparently, breathing 100% O_2 for 1 hour caused a decrease in CO_2 combining power of the blood and an increased acidity of the tissue and venous blood. (Authors' abstract, modified)

1579

Hochberg, C. B., 1952
and J. E. Hochberg
FAMILIAR SIZE AND THE PERCEPTION OF DEPTH. — Jour. Psychol., 34 (1): 107-114. 1952. DLC (BF1.J67, v. 34)

The effectiveness of "familiar size" cues as compared to "relative size" cues in depth perception was determined experimentally. Groups of test subjects monocularly viewed pairs of test images on screens, the distance of which could be altered interchangeably; they were requested to pronounce judgments as to relative distance of these images. Two sets of images were used, (1) that of an adult person and a boy, both of equal size, and (2) two images of the same boy at different sizes. On the basis of the test results it is concluded that "familiar size" cues, which involve past experience, are less effective than "relative size" cues, which do not require pre-perceptual recognition of retinal images, past experience, or unconscious inference.

1580

Hochberg, C. B., 1953
and J. E. Hochberg
FAMILIAR SIZE AND SUBCEPTION IN PERCEIVED DEPTH. — Jour. Psychol., 36 (2): 341-345. 1953. DLC (BF1.J67, v. 36)

As mentioned in a previous paper (Hochberg, C. B., 1952), familiar size is usually confounded with relative size; with the latter held constant, familiar size was not found to be effective in depth perception. Literature claimed in the paper, Ittelson, W. H., 1953, as supporting the value of familiar size, was examined again and Ittelson's criticisms were considered. No reason was found to alter the writers' previous position; though familiar size may affect and modify existing perceptual organizations, extension of this claim to include immediate perception (and to infer unconscious recognition or "subception") is still premature.

1581

Hoehn, A. J., 1953
and C. E. Zeleny
THE RELATION OF SELECTED BACKGROUND FACTORS TO THE JOB SATISFACTION OF AIRMAN INSTRUCTORS IN AIR FORCE TECHNICAL SCHOOLS. — Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base, Ill. Technical Report no. 53-25, Aug.

1953. v+10 p. (Project no. 507-010-0001).
AD 19 001 PB 112307

An effort was made to assess the relationship between job satisfaction and certain important background factors. Comparisons were made between job satisfaction scores of airmen differing in terms of the following 6 background factors: (1) grade, (2) time served as an instructor, (3) method of instructor selection, (4) marital status, (5) time in grade, and (6) length of instructional day worked. Analysis of the data indicated that instructors most likely to be dissatisfied with their assignments were those who were single, were in the lower 4 grades, had been instructing for over a year, had not recently been promoted, and had been drafted into their assignment. Suggestions are made on the basis of these data. (AD abstract)

1582

Hoelscher, B. 1953
MECHANISMS OF ALTITUDE ADAPTATION: THE COMBINED EFFECTS OF HYPOXIA, ADRENALECTOMY, AND THYMECTOMY IN PARABIOTIC RATS. — School of Aviation Medicine, Randolph Field, Tex. Oct. 1953. iii+6 p. (Project no. 21-1201-0001, Report no. 5).
AD 25 661 PB 113316

Three different types of parabiotic pairs of rats were established: intact (left)-intact (right) parabiotic pairs (Type I); intact (left)-adrenalectomized (right) parabiotic pairs (Type II); and thymectomized (left)-adrenalectomized (right) parabiotic pairs (Type III). Hemoglobin hematocrit, and red blood cell count values were increased in both partners when hypoxia was imposed on one parabiont. Adrenalectomy of one parabiotic partner was followed by a compensatory hypertrophy of the adrenals left in the copartner which was higher in degree following exposure to hypoxia. There was a marked difference in heart weight between the two partners when adrenalectomy was carried out in one partner (smaller in the adrenalectomized partner, more conspicuous when the nonadrenalectomized partner breathed an oxygen deficient gas mixture). The livers of hypoxic partners when united with unexposed adrenalectomized partners showed a slight fatty infiltration. Removal of thymus had no appreciable effect. The adrenalectomized partner breathing ambient air in most instances died first when hypoxia was imposed on the copartner. This suggests that the hormonal output of hypertrophied adrenals becomes critically insufficient for the adrenalectomized partner when the hypoxic partner has an increased demand for adrenal cortical steroids. (Author's summary)

1583

Hoff, E. C. 1953
AVIATION MEDICINE. — In: Cyclopedia of Medicine, Surgery and Specialties (Research Service 1953), p. 197-219. Philadelphia: F. A. Davis Co., 1953. DLC (R125.C96, Service 1953)

Experimental advances in aviation medicine during the year 1952 are reviewed. The discussion includes the following topics: altitude tolerance and acclimatization; diseases and injuries from accidents; selection, training, and performance of flight personnel; physiological effects of oxygen and of toxic gases in aviation; respiratory equipment, escape devices, and problems associated with air evacuation; public health aspects; human factors in design; and human space travel. (144 references)

1584

Hoffman, E. L., 1953
and J. H. Rohrer
AN OBJECTIVE PEER EVALUATION SCALE: CONSTRUCTION AND VALIDITY. — Tulane Univ. Urban Life Research Inst., New Orleans, La. Technical Report, [1953], 20 p. [Contract N7onr-43404]. AD 23 628 PB 114001

A study was made of peer ratings obtained by having the raters evaluate their peers on objective criteria of officer excellence. A peer evaluation scale was described in which statements describing the peer were selected on the basis of content analyses of paragraphs describing outstanding and inferior candidates for the billet of Marine Corps officers. The statements were written by enlisted marines with an average of three and one-half years of active service. The items used in the peer evaluation scale were selected from these statements on the basis of their ability to discriminate between the men ranked first, fifth, tenth, and last, in a section of approximately 15 men. This preliminary scale was administered to a second independent group of candidates and three indexes for item selection purposes were calculated - a total test index and an item variability index. By using these three indexes, 20 items were segregated for use in the final scale. This refined peer evaluation was administered to an independent sample of candidates. The rank-difference correlation was found between the average peer score for a candidate and his rank position in the platoon as determined by four line officers. An average rank-difference coefficient for correlation of peer score with final platoon standing (ρ coefficient) of 0.85 was obtained. Norms were determined for each platoon. A chi square test indicated homogeneity of the norms. (AD abstract, modified)

1585

Hoffman, E. L., 1953a
D. V. Swander, S. H. Baron, and J. H. Rohrer
GENERALIZATION AND EXPOSURE TIME AS RELATED TO AUTOKINETIC MOVEMENT. — Jour. Exper. Psychol., 46 (3): 171-177. 1953.
DLC (BF1.J6, v. 46)

The experimental design utilized two judgment sessions for each of the 42 subjects. There was, first, an initial training session during which the subject was required to make 50 judgments of the extent of movement of a light which actually moved at a constant distance within a luminous circular framework. Secondly, there was an "autokinetic" session in which a like number of

judgments were required, but in which the stimulus was a stationary light, exposed for a constant interval in the darkened room without the luminous frames. It was determined that, after a 30-minute rest period from the time of the initial training session, the subjects falsely perceived movement of the stationary light during the second session. The extent of the "autokinetic" movement was the same for the subjects as the extent of the actual movement of the light during the first, or training session.

1586

Hoffmann, W. 1952

[NEED OF PROTECTIVE EYE-GLASSES AND NEW TYPES OF GLASS] Schutzbrillenindikation und neue Glasarten. — Klinische Monatsblätter für Augenheilkunde (Stuttgart), 120 (1): 113-126. 1952. In German. DNLM

A survey of colored glasses for protection against glare is presented. Blue or green glasses of older make are color distorting, especially the former. Brown glasses, such as "Umbral" and "Rodex" are quite satisfactory and have a high color fidelity. "Perfa" color glasses produce a still better, more even glare reduction. Modern neophan glasses reduce glare very effectively and aid color vision in brilliant light by absorbing strongly the yellow, and very strongly the extreme red and infrared rays; green and blue are least absorbed; because of yellow absorption, the red and green colors appear strong and pure. All neophan glass colors are good. Rodenstock's "Amerikagrün" is greatly absorbent, very soothing and agreeable, having a similar spectral range as the normal eye.

1587

Hollander, E. P. 1953

THE RELATIONSHIP OF LEADERSHIP CHOICE TO AUTHORITARIAN ATTITUDES IN A MILITARY SETTING. — Naval School of Aviation Medicine, Pensacola, Fla. Jan. 26, 1953. 30+13+iii p. (Project Report no. NM 001 058.16.01) AD 10 397 UNCLASSIFIED

A significant negative correlation (r = -0.23) was obtained between authoritarianism and peer-nomination on leadership of 268 cadets. Ratings from authoritarian attitude scales (F-scale) were correlated with ratings from a sociometric study of leadership ability (a compilation of each cadet's evaluation of the leadership potentials of his section mates). Intelligence was related significantly to authoritarianism (r = -0.21) and to peer-nomination on leadership (r = +0.31); the relationship between authoritarianism and peer-nomination on leadership persisted when intelligence was held constant. Military bearing as measured by officer-like quality, a composite score, was positively and significantly correlated with peer-nomination on leadership, but was unrelated to authoritarianism. (AD abstract)

1588

Hollander, E. P. 1953a

PROBLEMS AND TECHNIQUES IN THE EVALUATION OF MOTIVATION AMONG NAVAL AVIATION CADETS. — Naval School of Aviation Medicine, Pensacola, Fla. Special Report, March 5, 1953. 11p. AD 131 597 UNCLASSIFIED

Previous studies on motivational aspects and attitudes of aviation personnel carried out by the author at the Naval School of Aviation Medicine, Pensacola, Fla., are reviewed (cf. Hollander, E. P., 1952, 1952a, 1953). Motivation can be accepted as a variable which enhances or diminishes the individual's performance in training and arises as a function of the interaction of his needs with the situational field in which he is immersed. Some basic core of motivation may be considered related specifically to naval air training and is subject to quantification. In the above-mentioned studies an attempt has been made of seeking to measure motivation through the use of attitude factors. While "morale" is to be considered an element primarily significant at the training level, "motivation" is of significance chiefly on the selection level. Attitude and motivation indices have been set up, based on interviews of cadets leaving training before (unsuccessful) and after (successful) completion of the full course.

1589

Hollander, E. P., 1953b
and E. R. Sausser

A FURTHER CONSIDERATION OF PEER NOMINATIONS ON LEADERSHIP IN THE NAVAL AIR TRAINING PROGRAM: PREDICTION OF COMPLETION OR FAILURE. — Naval School of Aviation Medicine, Pensacola, Fla. Oct. 12, 1953. 8+2 p. (Project Report no. NM 001 058.16.02). AD 27 389 UNCLASSIFIED

At the end of three months of preflight training a total of 268 naval aviation cadets participated in a rating scheme for their mates. Each section was administered a leadership-nomination form which presented the individual cadet with a list of his section mates. Each cadet nominated, in order, the three men whom he considered to be best qualified for the hypothetical position of student commander, and the three men whom he considered to be least qualified. Nominees were evaluated with respect to their present and eventual success as military leaders. Nominations were weighted +3, +2, +1, -1, -2, -3, from best to least qualified. Other measures utilized were ACE Intelligence Test score, Officer-Like-Qualities score (OLQ), and final preflight average (F. Av.). Of the 268 cadets initially tested and evaluated, 179 passed flight training, 32 failed, 28 withdrew, and 29 were separated for miscellaneous reasons. A matrix of intercorrelations among the predictor variables was constructed, and biserial r's were computed for each of those variables against the pass-fail criterion. While peer nominations and F. Av. predicted the pass-fail criterion at a significant level, OLQ and ACE did not. (AD abstract, modified)

1590

Hollander, E. P., 1953c
and J. T. Bair

MOTIVATION AMONG STUDENT AVIATORS. — U. S. Navy Med. News Letter, 22 (8): 33-36. 1953. DNLM

The papers, Hollander, E. P., 1952, 1952a, 1952b, 1953, 1953a, 1953b are reviewed, with particular regard to motivational aspects.

1591

Holmberg, G. 1953
THE ELECTROENCEPHALOGRAM DURING HYPOXIA AND HYPERVENTILATION. — Electroencephalography and Clinical Neurophysiol. (Montreal), 5 (3): 371-376. 1953. DNLM

In connection with a discussion of petit-mal seizures, a clinical study of the effects of hypoxia and/or hypocapnia on the activity of the brain is presented. Ten students and twenty-nine patients (some epileptic and others under electric shock therapy) were the subjects. When arterial oxygen saturation was 68-51% (accomplished by using a mixture of 6.5% oxygen and 4.5% carbon dioxide in nitrogen), the effects of hypoxia caused no alteration of EEG frequencies, but did decrease the amplitude of recorded wave activity. Hyperventilation in CO_2-free media caused EEG variations, depending upon the oxygen content of the inspired gas mixtures (7.5% oxygen in nitrogen showed maximal effects). When hypoxia and hypocapnia were induced, fast pulse rates were correlated with slow EEG activities (7.5% oxygen in nitrogen was used in addition to hyperventilation). It would appear, therefore, that hypoxia alone does not produce slow waves in an electroencephalogram, but that simultaneous hypocapnia is necessary before slow waves result.

1592

Hoople, G. D. 1952
UNSOLVED PROBLEMS RELATING TO HEARING LOSS IN INDUSTRY. — Jour. Acoust. Soc. America, 24 (6): 765-766. 1952.
DLC (QC221.A4, v. 24)

Discovery of reliable tests which will predict which ear will be sensitive to noise and which will not, is an important unsolved problem, but if solved would do much to clear many disputed questions. Noise in intensities of 120 to 150 decibels is conceded to be injurious to hearing. Noise less than 80 decibels is not a problem. Where between these two limits does noise become injurious to some ears? Noise with predominance of higher frequencies apparently is more injurious to hearing than one with predominance of low frequencies. The length of exposure to noise depends upon so many factors that it is certainly an unsolved problem. The character of the loss is an injury to the nerve of hearing and presents no problem except the differentiation between loss due to fatigue and permanent hearing loss. (Author's summary)

1593

Horne, E. P., 1952
and R. T. Saucer
DARK ADAPTATION AND APPARENT MOTION [Abstract]. — Amer. Psychologist, 7 (7): 243. 1952. DLC (BF1.A55, v. 7)

The dependency of apparent motion ("beta movement") of a successively presented target upon the degree of dark adaptation in twenty college students naive to the problem has been explored. A preliminary training trial was given each subject three weeks before the experiment began. After being exposed to five levels of dark adaptation (remaining in the completely dark room for 0, 5, 10, 15, and 30 minutes), the subjects were asked to press the key when beta was observed and release the key when it disappeared. Flash rates were 2 and 4 per second. The intensity of stimulation was at a brightness of 0.505 millilambert. Optimal beta motion was measured for duration and frequency over a period of five minutes. The analysis of variance and time course tests shows that mean length of beta movement is a function of dark adaptation time. The number of reversals from beta to loss of beta motion increased significantly from 0 to 10 minutes of dark adaptation. Comparisons between 0 and 15 minutes and 0 and 30 minutes were also significant. It was concluded that the degree of the dark adaptation influenced the perception of beta movement. (Abstract, modified)

1594

House, H. P. 1952
CLINICAL ASPECTS OF THE PROBLEMS OF NOISE IN INDUSTRY. — A. M. A. Arch. Indus. Hyg. and Occupational Med., 5 (2): 124-128. 1952.
DLC (RC963.A14, v. 5)

The diagnosis of early acoustic trauma is not difficult. Audiometric tests will reveal a characteristic dip in the frequency of 4,000 cycles per second long before the patient becomes aware of any symptoms referable to his ear. The differential diagnosis of more advanced acoustic trauma, after the patient becomes aware of his hearing loss, is much more difficult. Therefore, preemployment and routine periodic follow-up audiograms are essential not only to establish an accurate diagnosis but, much more important, to determine the presence of acoustic trauma at the earliest possible moment in order that adequate protective measures may be instituted. (From the author's summary)

1595

Howard, J. K., 1952a
and E. W. Pickrel
DISTRIBUTION STATISTICS AND VALIDITY COEFFICIENTS OF AIRMAN CLASSIFICATION BATTERY AC-1 FOR NEGRO MALE SAMPLES. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-10, March 1952. 10 p. (Project no. 503-001-0001). AD 121 701
UNCLASSIFIED

The data in this research note are preliminary data in a study of the validity of Airman Classification Battery AC-1 for Negro male samples. At this time product-moment validity correlations have been computed on all airman battery variables, using final school grade as the criterion for six different technical schools. The range in aptitude index scores to be found among graduates of technical schools is restricted by the technical school entrance requirements. This imposes a restriction on the validity coefficients which may

be corrected by formula. In general, both the uncorrected validities and those corrected for restriction in range are lower for these Negro samples than those for white male samples graduating from the same schools, though not in the same classes. In most cases the relative sizes of the correlations are similar, with the most valid variable for a Negro male technical school sample being also the most valid variable, or nearly so, for a white male sample graduating from the same technical school. (From p. 1-2)

1596

Howard, R. A. 1953
SUN, SAND, AND SURVIVAL: AN ANALYSIS OF SURVIVAL EXPERIENCE IN DESERT AREAS. — Air University. Arctic, Desert, Tropic Information Center, Maxwell Air Force Base, Ala. ADTIC Publication no. D-102, Jan.1953. 6+42 p.
AD 30 335 UNCLASSIFIED

This study represents a compilation of survival episodes based on personal experiences of 382 aviators of the Allied Forces in the desert regions of North Africa (during the campaign of 1940-43), as well as survival accounts from the desert region of the southwestern United States. The following aspects are discussed and analyzed: nature of the emergency descent, ways of travel through the desert, means of navigation, environmental hazards (mirages, dangers from larger animals and insects), water sources, means of purification of water supplies, water substitutes, improvisation of shelter, wearing apparel, maintenance of health and strength, value of standard rations, animal and vegetable emergency food supplies, contact with the native populations, emergency signaling devices, and personal equipment. The survival episodes under discussion involve special factors not encountered under peace-time conditions (security measures, availability of abandoned military equipment, absence of organized rescue missions, etc.). The lack of psychological preparedness and training for survival was evident in the majority of cases, and remedial measures are recommended.

1597

Howard, R. A. 1953a
DOWN IN THE NORTH: AN ANALYSIS OF SURVIVAL EXPERIMENTS IN ARCTIC AREAS. — Air University. Arctic, Desert, Tropic Information Center, Maxwell Air Force Base, Ala. ADTIC Publication no. A-103, April 1953. vi+50 p.
AD 30 334 UNCLASSIFIED

Records were used of 268 aircraft which crashed in the Arctic, and of 24 individuals who were lost accidentally or bailed out from aircraft in flight. No emergency descent in the Arctic was considered unless at least 24 hours elapsed before the individual was rescued. The problems of Arctic survival considered include weather, health and injuries, heating and cooking fires, clothing, water, problems of food, survival hazards, and travel. The discussion of aids to survival covers attitude, morale, and philosophy of survivors; discipline; schedule of activities; smoking; comments on equipment; survival training and instruction; and signaling and rescue methods. (AD abstract)

1598

Howitt, J. S. 1953
PSYCHOLOGICAL ASPECTS OF MODERN OPERATIONAL FLYING. — Medical Press (London), 229 (8): 178-181. 1953. DNLM

Psychological problems associated with greater speeds and operating heights are in particular referrable to jet fighter pilot work loads. Psychological stresses are liable to develop as a result of the intensive mental work in jet flight, and tensions associated with the desire to achieve successful results. The extent of psychological effects depends on the susceptibility to tensions on the part of the individual pilot. A direct relationship to previous experiences with similar tasks might be detected. Flight conditions which may affect the "psychological load" are weather and instrument flying, navigational problems, altitude, high speed, and concern about survival in emergencies. It is concluded that the use of radar and other electronic aids will alleviate pilot strain.

1599

Hubbard, H. H., and L. W. Lassiter 1953
EXPERIMENTAL STUDIES OF JET NOISE. — Jour. Acoust. Soc. America, 25 (3): 381-384. 1953. DLC (QC221.A4, v. 25)

The mixing region of a jet is observed to be a complex noise generator. The noise produced is highly directional and is affected by various geometric and flow parameters as well as by conditions in the settling chamber upstream of the nozzle. Noise measurements for a family of circular model air jets ranging in diameter from 3/4 to 12 inches are consistent with available data for a turbojet engine. The intensity of the fluctuating pressure field near the jet is greatest at an axial distance of approximately two diameters downstream from the nozzle exit and decreases generally with increasing distance. The frequency spectrums recorded near the jet boundary are usually peaked, the peak frequencies being higher near the jet exit than at points farther downstream. These noise frequencies generally increase with increasing jet fluid velocity and decrease with increasing jet size. Hot-wire surveys of turbulence (axial velocity fluctuation) in the jet stream indicated spectrums which were very similar in quality to the noise spectrums recorded just outside the jet boundary and at the same axial stations. (Authors' summary)

1600

Hürlimann, A. 1953
RESISTANCE OF HEARTS WITH CORONARY OCCLUSION TO ANOXIA. — Amer. Jour. Physiol., 172 (2): 437-445. 1953 DLC (QP1. A5, v. 172)

The acute circulatory effects of ligation of the anterior descending branch of the left coronary artery were studied in a series of 26 anesthetized dogs. Changes in vasomotor tone were assayed by comparing pressure-flow relationships in a hind

leg during control and experimental periods. A simple exponential relationship was observed between control pressure and flow in the majority of experiments. In approximately one-fourth of the experiments no significant change in vasomotor tone was observed, and yet blood pressure returned to or toward control following occlusion. In these cases, compensation must largely have been cardiac in origin. In most of the remaining experiments a significant degree of vasoconstriction occurred following production of myocardial ischemia, or ventricular fibrillation developed before the vasomotor response could be ascertained. In not a single case did an appreciable degree of vasodilatation appear, nor did mean arterial pressure ever return toward control levels following bilateral vagotomy. Therefore, the decline in blood pressure resulting from acute coronary occlusion in our experiments was not due to any reflex mechanism originating in ischemic myocardial tissues. The only possible physiological counterpart of the veratrinic reflex observed in our experiments was the decrease in heart rate obtained in two experiments following coronary ligation. The fact that this relative bradycardia was abolished by vagal section is compatible with this possibility, but the afferent limb of this reflex could not be established from our studies. (Author's summary)

1601

Hürlimann, A. 1953a
and C. J. Wiggers
THE EFFECTS OF PROGRESSIVE GENERAL ANOXIA ON THE PULMONARY CIRCULATION. — Circulation Research, 1 (3): 230-237. 1953.
DNLM

Simultaneous measurements of aorta, pulmonary artery, and left atrial pressures of barbitalized dogs were made under reduced oxygen pressures of 10 or 12%. Aortic and pulmonary pressures, and pulse pressures increased, while the left atrial pressure was relatively unaffected. Pulmonary blood flow increased with elevation of pulmonary and arterial pressures, as did pulmonary arterial resistance. Augmented stroke volumes were noted for both ventricles. The author concludes that even though an increase in peripheral pulmonary resistance may cause a rise in pulmonary arterial pressure, the major cause of pulmonary pressure increase is due apparently to an increased output of the right ventricle.

1602

(Human Factors) 1953
DEVELOPING A GROUND TRAINING COURSE IN AIRCREW OPERATIONS PROCEDURE: A REPORT OF PROGRESS, 1 JANUARY TO 30 JUNE, 1953. — Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memo Report no. 37, July 1953. 80 p. AD 17 728
PB 113184

Progress is reported on the development of a ground training method to increase the ability of B-29 aircrew members to work effectively in flight. Aircrews will be presented with typical problems and encouraged to reach solutions by group discussions. The selection of the material, known as crew operations procedures (COP), was discussed, and a questionnaire containing COP material is proposed to measure the ability of crew members to work together. (AD abstract)

1603

Hunt, D. P. 1953
THE CODING OF AIRCRAFT CONTROLS. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-221, Aug. 1953. v+26 p. (RDO no. 694-17). AD 20 796
PB 111322

This report summarizes the available information concerning several techniques of coding of aircraft controls, which seem to be of value to the design engineers. Control coding means providing the operator with a way of identifying the controls. Five methods of control coding are discussed: Shape coding, size coding, location coding, color coding, and mode-of-operation coding. Information is given concerning each coding technique so that the design engineer can apply any of these methods as the need arises. Many of the advantages and disadvantages of each method are pointed out. The question of when to code and the type of coding to use are discussed. (Author's abstract)

1604

Hunt, R. W. G. 1952
LIGHT AND DARK ADAPTATION AND THE PERCEPTION OF COLOR. — Jour. Optical Soc. Amer., 42 (3): 190-199. 1952.
DLC (QC350.O6, v. 42)

A description is given of an apparatus which has been constructed for the purpose of investigating, by means of the binocular matching technique, the changes in color perception which arise when the state of adaptation of the eye is altered. The changes in color perception, consequent upon changes in the intensity of the adapting light in seven steps from zero to 100 candles per square foot, have been investigated for two observers. The adapting field size was 60°; the test-field size was 20°. There was found a gradual decrease in the saturation of colors as the adapting light intensity was lowered. At low levels, the saturation increased with increasing test-color intensity; but at high levels, increasing test-color intensity caused most colors to become bluer. The sensation corresponding to dim light seen by the dark-adapted eye was found to be pale blue, and not colorless. A final section considers the problem of how the activity of a fourth "white" receptor mechanism might be reconciled with trichromatic matching, and in particular with the constancy of monocular color matches with changes in adaptation. (Author's abstract)

1605

Hunt, R. W. G. 1953
THE PERCEPTION OF COLOR IN 1° FIELDS FOR

DIFFERENT STATES OF ADAPTATION. — Jour. Optical Soc. Amer., 43 (6): 479-484. 1953.
DLC (QC350.O6, v. 43)

The variations in the hues and saturations of colors, when seen under different intensities of adapting light, have been measured by the binocular matching technique, using a 1° field. The results were very similar to those obtained using a 20° field. The theoretical implications are discussed. (Author's abstract)

1606

Hunt, W. A., 1953
C. L. Wittson, and E. B. Hunt
THE SERVICEABILITY OF MILITARY PERSONNEL. — Northwestern Univ., Evanston, Ill. [1953]. 5 p. (Contract [N]7onr-450(11)). AD 26 229
UNCLASSIFIED

Groups of individuals of low intelligence (mental age of 12 years, 6 months or less) and of low intelligence plus psychiatric symptomatology were studied to determine the rate of discharge from military service for neuropsychiatric, other medical, or disciplinary reasons. The low-intelligence group had a higher incidence of discharges than a group of normal controls. The group with low intelligence plus psychiatric symptomatology had higher discharge rates than the group of low intelligence only. (AD abstract)

1607

Hurvich, L. M., 1953
and D. Jameson
SPECTRAL SENSITIVITY OF THE FOVEA. I. NEUTRAL ADAPTATION. — Jour. Optical Soc. Amer., 43 (6): 485-494. 1953.
DLC (QC350.O6, v. 43)

The spectral sensitivity of the 1° fovea of the right eye of two practiced observers was measured at 10 mμ intervals from 400 mμ to 700 mμ for the dark-adapted state and for the bright-adapted (10 mL), chromatically neutral state. Ten complete luminosity functions were obtained for each observer for each of the specified adaptations. The data of these experiments are intended to provide controls against which to evaluate luminosity data for different chromatic states. Moreover, the functions for both observers are shown to undergo a change in form and a displacement from the bright to the dark-adapted state. These changes in the foveal functions; although small in magnitude, are in the same sense as the familiar "Purkinje shift". Alternative theoretical explanations of the data are discussed and analyzed. (Authors' abstract)

1608

Hussman, T. A. 1952
REVIEW OF THE LITERATURE ON MEASURES OF STEADINESS AND BODY SWAY AS RELATED TO FATIGUE. — Univ. of Maryland, College Park. Technical Report no. 1 on Indicators of Behavior Decrement, Feb. 13, 1952. 15 p. (Contract DA-49-007-MD-222 (O.I. 19-52)). AD 30 778
UNCLASSIFIED

A critical review of the literature on steadiness and body sway is presented. The various types of apparatus and their modifications which have been designed to measure these variables are described and their reliabilities presented when available. A coverage of the literature on studies concerned with the application of these measures has revealed them to be of possible use as dependent variables in behavior decrement investigations. (Author's summary)

58 references.

1609

Hussman, T. A. 1952a
A CRITICAL EVALUATION OF FOUR INDICATORS OF BEHAVIOR DECREMENT. — Univ. of Maryland, College Park. Technical Report no. 12 on Indicators of Behavior Decrement, Aug. 25, 1952. 23 p. (Contract DA-49-007-MD-222)
AD 31 301 UNCLASSIFIED

Steadiness, blind steadiness (body sway), critical flicker frequency thresholds, and manual tapping were tested. Twelve experienced boxers and twelve novice boxers were measured under the following four conditions: at rest, after heavy exercise, before fighting, and after fighting. The tests were administered three times to each subject under each of the experimental conditions. The analysis of variance technique was used to test the changes in each variable as a function of the independent variables. The results indicated that steadiness changes as a result of the fatigue situation. Critical flicker frequency thresholds changed as a result of the anxiety situation, but the magnitude of the changes was not sufficient to permit prediction. Blind steadiness scores changed as a function of both fatigue and anxiety and were reliable enough for prediction. Changes in tapping and blind steadiness time scores were not sufficiently reliable for prediction purposes. The conclusion was drawn from these results that the general variable of steadiness most nearly met the criteria for adequate indices of behavior decrement. (Author's summary, modified)

1610

Hyde, R. W., 1953
and J. Tonndorf
SPEAKING EFFICIENCY OF FLIERS WITH LARYNGEAL PARALYSIS: DEVELOPMENT OF A ROUTINE TEST METHOD. — School of Aviation Medicine, Randolph Field, Tex. March 1953. iii+9 p. (Project no. 21-1203-0001, Report no. 2).
AD 7469 UNCLASSIFIED

Two fliers, one affected with unilateral, the other with bilateral laryngeal paralysis (sequelae of bulbar poliomyelitis), underwent speech intelligibility tests under the following conditions: (1) using a mask microphone, a throat mike, and a hand mike at various altitudes (sea level, 10,000 ft., and 30,000 ft.) and in the presence of aircraft noise; and (2) using a hand mike at sea level without

noise. In the unilaterally paralyzed subject speech intelligibility was found to be well within normal limits and below the point of impairing communication in aircraft noise. Bilateral laryngeal paralysis is recognized as a potential safety hazard. The testing procedure is recommended with modifications, for the evaluation of other lesions which might affect speech intelligibility.

1611

Hyde, R. W., 1953a
J. Tonndorf, and H. I. Chinn
ABSORPTION FROM NASAL MUCOUS MEMBRANE: FURTHER STUDIES ON SYSTEMIC MEDICATION WITH HYOSCINE. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. 2+3 p. (Project no. 21-1208-0010; Report no. 4). AD 25 667 PB 113317

There was a trend for sublingual tablets of hyoscine to be absorbed slightly more rapidly and completely than oral capsules. However, the sublingual route was definitely inferior to both the intranasal and the subcutaneous route in both these respects. The addition of hyaluronidase to hyoscine nose drops had no effect on either the speed or degree of absorption. At 15 and 30 minutes following medication, there was significantly less absorption from the mucosa of both the nasal septum and the nasopharynx than from other parts of the nasal cavity. Later, the difference in absorption was no longer of statistical significance. There was no significant difference in the systemic effect of hyoscine nose drops regardless of whether they were administered to the roof of the nasal cavity, to the floor of the nose, or directly to the inferior turbinate. (Authors' abstract)

1612

Hyde, R. W., 1953b
J. Tonndorf, and H. I. Chinn
ABSORPTION FROM NASAL MUCOUS MEMBRANE: SYSTEMIC EFFECTS OF ATROPINE FOLLOWING INTRANASAL ADMINISTRATION. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. iii+4 p. (Project no. 21-1208-0010, Report no. 5). AD 25 668 PB 113318

Using the depression of salivary secretion as a criterion, the systemic effect of intranasal atropine was evaluated using doses up to 2.0 mg. Subcutaneous injection resulted in the most rapid and complete degree of absorption; nose drops and nasal spray (in detergent) were intermediate in effect between the subcutaneous and the sublingual routes. The addition of a detergent and of hyaluronidase to atropine nose drops had no effect on the rate or degree of absorption. Atropine was found to cause less complete depression of salivary secretion than did smaller doses of hyoscine when subcutaneous and intra-nasal administration were compared. This is interpreted as reflecting a lower antisialogogic activity of atropine rather than a slower rate of absorption. More side reactions were noted with the atropine than with hyoscine. Possible explanations for these differences are considered, and possible uses of the intranasal route for medication are discussed. (Authors' summary)

1613

Hyman, R. 1953
STIMULUS INFORMATION AS A DETERMINANT OF REACTION TIME. — Jour. Exper. Psychol., 45 (3): 188-196. 1953. DLC (BF1.J6, v. 45)

The reaction time to a visual stimulus, consisting of a matrix of small lights, was investigated as a function of the amount of information conveyed by that stimulus. The amount of information in the stimulus was varied by varying (a) the number of equally probable alternatives from which it could be chosen, (b) the proportion of times the stimulus could occur relative to the other possible alternatives, and (c) the probability of its occurrence as a function of the immediately preceding stimulus presentation. The reaction time to the amount of information in the stimulus produced a linear regression for each of the three ways in which information was varied. The three regression lines obtained by the three separate ways of varying the amount of information were found to coincide for three subjects. In the case of the fourth subject, a systematic displacement of one of his regression lines was attributed to a relatively large practice effect which he showed for that experiment. (Author's abstract)

1614

Ìarbus, A. L. 1952
[OVERESTIMATION OF THE UPPER PART OF A FIGURE] Pereotsenka verkhneĭ chasti figury. — Problemy fiziologicheskoĭ optiki (Moskva), 10: 134-140. 1952. In Russian.
DNLM (WI. PR5815, v. 10)

An analysis of a visual illusion, consisting in the overestimation of the upper part of a figure, is presented with the aid of sketches for demonstration. It is shown that whenever the upper and lower parts of a figure are not connected, or connected so slightly that they do not appear as parts of a single whole, there is no, or a very slight, effect of overestimation. When these parts appear as constituents of a single figure or object, a considerable overestimation of the upper part results in 80-85% of the cases except when such an overestimation would sharply contradict a geometrical concept (e.g., a circle, or a square). Perception tests within the 100° perimeter of vertical eye movement show that the visualized dimensions of objects diminish if the eyes are raised or lowered from their central position; the decrease is greater when the eyes are lowered. All upper parts of objects placed above the eye level will give a smaller image on the retina than the lower parts of these objects; in the space between the eye level and the earth the effect will be reversed. It follows from these facts that this illusion is due to the constancy of object forms as experienced in the objective world, which is the corrective introduced into visual perception, as distinct from illusions conditioned by the constancy of size perception, e.g., the illusion of perspective (where the visualized dimension decreases much less than its image on the retina).

1615

Illig, H., 1953
M. Pflanz, and T. Von Uexküll
[EXPERIMENTAL INVESTIGATIONS CONCERNING THE SMALLEST TIME UNIT (MOMENT) OF OPTICAL PERCEPTION] Experimentelle Untersuchungen über die kleinste Zeiteinheit (Moment) der optischen Wahrnehmung. — Pflügers Archiv für die gesamte Physiologie (Berlin), 257 (2): 121-136. 1953. In German. DLC (QP1.A63, v. 257)

"Moment" is defined as the smallest unit of time in which all stimuli are perceived as simultaneous, with no regard to their objective frequency. A variation of the classic flicker fusion frequency determination method is developed to determine the "moment": a rotating disk interposed between a light source and the subject has two small slots opposing each other at a distance of 180°; thus the subject, looking through an observation slot behind a screen receives two separate retinal stimuli which are perceived, at slow disk rotation, as one moving dot, and at faster rotation, as two stationary dots (flicker fusion threshold). The "moment" (i.e., the threshold speed), determined on 118 subjects, was found to have a mean value of 102.8 ± 0.82 msec. As this value did not depend on light intensity, retinal adaptation, or visual angle, and since the stimulus was received at two separate points on the retina it was concluded that "moment" is a central rather than retinal phenomenon; i.e., the perception of two separate light stimuli depends not only on their objective arrival on the retina but also on rhythmic electrical discharges of ganglion cells along the pathways to the cortex. This assumption is enhanced by the fact that hyperventilation, which is known to slow down the cerebral rhythm, has an identical slowing down effect on the "moment".

1616

Irwin, I. A. 1953
A PRELIMINARY STUDY OF METHODS FOR CONDUCTING THE POST-MISSION CRITIQUE IN A COMBAT CREW TRAINING SITUATION. — Human Resources Research Center. Combat Crew Training Research Lab., Randolph Air Force Base, Tex. Research Bulletin no. 53-16, June 1953. v+44 p. (Project no. 511-050-0001). AD 19 469 UNCLASSIFIED

Recorded post-mission critiques of 12 instructor crew-student crew combinations were examined with respect to measures of critique effectiveness. Variations in instructor procedures of handling the critiques were related to student reaction, instructor perception of student reaction, and four measures of student performance. The extent to which instructors encouraged student participation appeared to contribute to critique effectiveness. The over-all performance seemed better when the referent behavior of critiques was clearly indicated. A negative reaction to long critiques was suggested. (AD abstract)

1617

Ittelson, W. H. 1953
A NOTE ON "FAMILIAR SIZE AND THE PERCEPTION OF DEPTH." — Jour. Psychol., 35 (2): 235-240. 1953. DLC (BF1.J67, v. 35)

Principles elaborated by the Hochbergs (cf. Hochberg, C. B., 1952) are refuted. They have stated that: (1) they do not like theories which invoke the concept of familiar size as a cue to depth perception; and (2) the evidence for the existence of this cue is questionable since most of it confuses familiar size with relative size. In order to reconcile the arguments advanced above, several experiments were carried out which are not considered in the paper by the Hochbergs. These experiments either successfully separate familiar size from relative size, or cannot be accounted for by an "autochthonous tendency toward homogeneity", or both. The experiment reported by the Hochbergs is then discussed, and their conclusions are found to be unjustified both by their own criterion and on methodological grounds. (Author's summary, modified)

1618

Ivens, F. C., 1952
and G. Friedman
INTERCORRELATIONS, DISTRIBUTION STATISTICS, AND MULTIPLE CORRELATIONS OF AIRMAN CLASSIFICATION BATTERY SOORES (AC-1B) AND APRIL 1951 AIRCREW CLASSIFICATION BATTERY SCORES. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-3, Jan. 1952. 7 p. (Project no. 503-001-0003). AD 76 651 UNCLASSIFIED

"No previous correlational studies have involved both the Airman Classification Battery (AC-1B) and the Aircrew Classification Battery except for some factor analyses involving several tests of each battery. This study provides the basis for fulfilling the following two needs: (a) for selection purposes it will be possible to provide a rough screening device from the Airman Classification Battery; (b) for recruitment purposes it will be possible to determine the number of airmen qualified for cadet training. Using the correlations between pilot stanine of the Aircrew Classification Battery and the Airman Classification Battery (AC-1B) and between navigator stanine of the Aircrew Classification Battery and Airman Classification Battery (AC-1B) as correlates, multiple correlations and beta weights were computed for the Airman Classification Battery." (From p. 1)

1619

Jacobs, E. C. 1953
MEDICAL SCREENING OF MILITARY MAN POWER: UTILIZATION OF THE PHYSICAL PROFILE SERIAL SYSTEM. — Military Surgeon, 112 (2): 112-118, 1953. DLC (RD1.A7, v. 112)

The Physical Profile Serial System is a simple,

graphic system of portraying both physical and mental fitness, and is based upon the individual's ability to perform various military duties. To be successful it is essential that the profile serial be correctly applied by the profiling medical officer or profile classification board; that it be precisely interpreted by the classification and assignment officer; and that it be carefully administered by the individual's unit commander. The selection of military man power by careful medical screening, including the utilization of the physical profile serial system in conjunction with classification based upon occupational skill can result in the achievement of a high degree of military proficiency by placing the right man in the right job. (From the author's summary and conclusions)

1620

Jameson, D., 1953
and L. M. Hurvich
SPECTRAL SENSITIVITY OF THE FOVEA. II. DEPENDENCE ON CHROMATIC ADAPTATION. — Jour. Optical Soc. Amer., 43 (7): 552-559. 1953. DLC (QC350.O6, v. 43)

The dependence of the foveal luminosity function on chromatic adaptation is investigated in these experiments. Results are compared for 5 different states of adaptation. The adapting fields were a chromatically neutral white and four chromatic fields perceptually unique in hue: blue, green, yellow, and red. The adapting luminance was the same in all cases (= 10 mL). For each adaptation, ten threshold sensitivity functions were measured at every 10 mμ from 410 mμ to 700 mμ, for each of two observers. The spectral sensitivity function is shown to undergo small, but regular and consistent changes with changes in chromatic adaptation. The theoretical implications of these results are discussed. (Authors' abstract)

1621

Jenkins, J. G. 1953
AVIATION PSYCHOLOGY. — In: Roddis, L. H., and J. L. Schwartz. The History of the Medical Department of the United States Navy in World War II, v. 1, p. 221-228. Office of the Surgeon General (Navy), Washington, D. C., 1953. DLC (D807.U6A53, v. 1)

During the First World War it was realized that selection of personnel could not be based solely on physical fitness, but should include a factor based on mental attributes. In an effort to standardize the neuropsychiatric selection procedure various aids were used. First (in 1935) the Strong Interest Inventory was used. Research into the problem of pilot selection according to physiological and psychological measurements led to the inclusion of an intelligence test, biographical inventory, and a vocational interest test. At the same time, qualified personnel were required to analyze and evaluate the tests. The development of various types of tests led to the conclusions that, in general, intelligence tests were found to be a good predictor of Ground School performance, but was only a small contributor to the prediction of flight training success. The pressing need for pilots led to the development of four central research groups to study various aspects of aviation psychology.

1622

Jenkins, W. L., 1952
and M. W. Olson
THE USE OF LEVERS IN MAKING SETTINGS ON A LINEAR SCALE. — Jour. Applied Psychol., 36 (4): 269-271. 1952. DLC (BF1.J55, v. 36)
Essentially the same as: Lehigh Univ. Inst. of Research, Bethlehem, Pa. (Contract W33-038ac-22561, E. O. 694-17); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. AF Technical Report no. 6563, Aug. 1951. iii+12 p. (RDO no. 694-17, PO-6). TIP U21026 PB 106303

Right-left-moving levers of various lengths were used to match pointer position with lighted inserts on a horizontal nine-inch linear scale with tolerances of 0.016 in. and 0.100 in. Performance with rotary control knobs was used for comparison. With lever-lengths between 6 in. and 30 in., the important factor seems to be the ratio of the movement of the lever-tip (L) to the movement of the pointer (P). The optimal L/P appears to be approximately three or four. That is, the lever-tip should move three or four times as fast as the pointer. Adding friction accentuates the optimum without changing it. The maximum L is limited by the maximum reach of the subject (about 38 in.). A rotary knob with a ratio of about six inches of pointer movement for one complete turn of the knob appears to be as good as any lever combination in making settings to coarse tolerances on a nine-inch scale. It seems probable that this would also hold true for longer scales. (From authors' abstract)

1623

Jenkins, W. L. 1953
DESIGN FACTORS IN KNOBS AND LEVERS FOR MAKING SETTINGS ON SCALES AND SCOPES: A SUMMARY REPORT. — Lehigh Univ., Bethlehem, Pa. (Contract AF 18(600)-24); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-2, Feb. 1953. iii+5 p. (RDO no. 694-17). AD 9724 PB 109616

This is a brief summary of the report, Jenkins, W. L., 1952, and prior reports, prepared by the author at Lehigh University on the design of knobs and levers. The time required to make a setting is affected more by the ratio of control movement to indicator movement than by inertia, friction, backlash, setting tolerance, or control size. When a control knob is used to make settings on a linear scale, the optimal ratio is found to be: (a) for fine tolerances (0.007 to 0.015"), one or two inches of pointer movement for one complete turn of the knob; (b) for coarse tolerances (0.16 to 0.100"), about six inches of pointer movement for one turn of the knob. When a lever is used to make settings on a linear scale to coarse tolerances (0.16 to

0.100"), the optimal ratio is one unit of pointer movement to three units of lever movement. When a joy stick is used to make settings, in two dimensions, on a simulated scope face to coarse tolerances (0.10"), the optimal ratio is one unit of indicator movement to two-and-a-half units of stick movement. (Author's summary, modified)

1624

Jenness, A. F., and R. O. Rouse 1953
OPERATOR CAPACITY TO PREDICT TARGET POSITION. — Williams Coll., Williamstown, Mass. Progress Report no. 1 (June 1-Aug. 31, 1953), Sept. 15, 1953. 7 p. (Contract AF 30(602)-666). AD 19 176 UNCLASSIFIED

The preliminary stage of this research has involved: (1) a search of the literature for relevant studies, (2) the construction of apparatus, and (3) tentative planning of the experiments. It is planned to have subjects predict the position of extrapolated straight lines, arcs, and combination functions at various extrapolation distances. The subject will be seated five feet from a circular display containing single tracks in some instances and various combinations of tracks in others. In the main experiments the subject will indicate his estimate of the position at each extrapolation distance by means of a movable dot of light operated by turning a knob. In most instances the display will not contain coordinates, but in some instances a square grid system will be utilized as a control. Experimentation may also be carried on with subjects drawing the predicted track on a replica of the large dispaly. (Authors' abstract)

1625

Jensen, M. B. 1952
SOME CONCOMITANTS OF ADJUSTIVE AND NON-ADJUSTIVE REACTIONS TO BASIC TRAINING IN THE AIR FORCE [Abstract]. — Amer. Psychologist, 7 (7): 389. 1952. DLC (BF1. A55, v. 7)

The careers of 5, 266 airmen have been checked during and at the end of eight weeks of basic training. Data have been secured from the following sources: (a) evaluations by tactical instructors (noncommissioned officers responsible for training at the flight level); (b) psychiatric evaluations on those given psychiatric referral subsequent to initial evaluation and on those discharged for administrative reasons--inaptitude, mental deficiency, unadaptability, etc; (c) medical records of those who failed to complete basic training because of hospitalization or discharge for medical reasons; (d) readministration of the Personal Report at the end of the basic training period of 684 airmen in 10 Flights; and (e) end-of-basic-training interviews by psychological assistants, psychologists, or psychiatrists, or a coordination of these, of 93 airmen considered seriously maladjusted, either at the beginning of basic training, at the end of basic training, or at both times. Reactions of the 5, 266 airmen studied are categorized according to: (a) normality or type of psychiatric disorder present; (b) degree or psychiatric disorder when present; (c) area of maladjustment; and (d) gain in adjustment. Initial evaluations and predictions are compared with subsequent evaluations and with basic-training performances.

1626

*Jilek, L., and J. Myslivecek 1953
[THE COURSE OF RESISTANCE TO ANOXIA UNDER LOW ATMOSPHERIC PRESSURE IN RELATION TO ONTOGENESIS] Vývoj odolnosti k výškové anoxii v ontogenese. — Československa fysiologia (Praha), 2 (3): 293-296. 1953. In Czech. DNLM (W1. CE885, v. 2)

An experimental study was made on 236 white rats, 1-30 days of age, subjected to low atmospheric pressure. Simulated elevation was effected at a rate of approximately 1000 m./min., with 5-minute hold-overs at various altitudes. Instances of death and motor reactions were recorded. Results showed that the resistance to anoxia decreased stepwise with age; the first decrease was observed at the age of 8-10 days, the second, approximately on the 15th, the third on the 20th day. Rats up to 8 days of age died at 20, 000 m., those 10-14 days old at 17, 000 m., those 15-19 days old at 14, 900 m. and animals 20-30 days old at 13, 300 m. It is believed that these results can be related to the maturation of the nervous system, in particular of the brain. Experiments with eye enucleation in part of the animals showed that the changes in resistance do not depend directly on incipient functioning of the peripheral part of the visual analysor, since in white rats it begins to function approximately at the age of 15-16 days, and the stepwise decrease in resistance to anoxia was observed before and after this time. [Abstract (modified) in Referativnyĭ Zhurnal, Biologiia (Moskva), 1955 (15): 221. DLC (QH7. A5433)]

1627

Jimenez, J. A. 1953
STAY OXYGEN CONSCIOUS. — Flying Safety, 9 (4): 22-24. 1953. DLC (UG633. F55, v. 9)

The value of using oxygen equipment during routine flights above 8, 000 ft. is discussed. A decrease in aircraft accidents may result if oxygen equipment and supplies are available at all bases at all times. It is the responsibility of the pilot to check his oxygen equipment and supply. At the same time it is the responsibility of the clearing authorities to maintain flight under the proper rules and regulations with regard to the aircraft as well as to pilot qualifications.

1628

Johnson, C. C. 1953
TRAINING OF ARCS PERSONNEL IN BALLOON LAUNCHING TECHNIQUES PROGRAM DIRECTIVE NO. 31. — Holloman Air Development Center, Holloman Air Force Base, N. Mex. Summary Report (for Oct. 9, 1952 to December 19, "1953"), May 15, 1953. 4 p. (Report no. HDT-112). AD 10 630 UNCLASSIFIED

Balloon-inflating and -launching instructions

were given to three classes of Air Resupply and Communication Service (ARCS) personnel in the form of classroom training, observation of launchings, and experience in handling the equipment. The training covered all the techniques being used by the Balloon Sonde unit. Only a small amount of further orientation was necessary for six trainees immediately assigned to a job; the training program is considered successful. Recommendations are made for training balloons for individual trainees and a school for instrumentation. (AD abstract)

1629

Johnson, W. H., and J. W. Mayne 1953
STIMULUS REQUIRED TO PRODUCE MOTION SICKNESS: RESTRICTION OF HEAD MOVEMENT AS A PREVENTIVE OF AIRSICKNESS—FIELD STUDIES ON AIRBORNE TROOPS. — Jour. Aviation Med., 24 (5): 400-411, 452. 1953. DLC (TL555.A1A4, v. 24)

The effectiveness of an immobilizing headrest in preventing sickness was studied in personnel while flying in gliders (Hadrian gliders) and transport planes (Dakota DC-3 aircraft). Preliminary tests without the headrest demonstrated that a 30-minute flight was sufficient to cause 60% of the subjects to become airsick under usual daytime flight conditions. Data were collected from over 500 subjects in approximately 700 trials. Half of the participants were given placebos and informed that this was a new type of motion sickness medicine (control group); the other half used the headrest device (experimental group). Flights were made under various turbulence conditions: normal rough, violent. Results indicated that it is possible to predict that in approximately 95 out of every 100 flights made under normal turbulence, the use of the headrest device would prevent airsickness in susceptible individuals in 60-83% of the cases. Susceptibility to airsickness varied from 30-41% under normal turbulence, and from 42-74% for conditions of very rough turbulence. For any given turbulence condition, there was no real difference between susceptibility rates for gliders and for Dakotas.

1630

Johnston, W. A. 1953
FIT TO BE TIED. — Flying Safety, 9 (5): 18-21. 1953. DLC (UG633.F55, v. 9)

An informal illustrated description is presented of the procedures to be employed in fitting the P-3 type flying helmet.

1631

Jones, Earl I., and E. A. Bilodeau 1953
RETENTION AND RELEARNING OF A COMPLEX PERCEPTUAL-MOTOR SKILL AFTER TEN MONTHS OF NO PRACTICE. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-17, June 1953. iv+14 p. (Project no. 509-020-0007). AD 19 462 UNCLASSIFIED

This study demonstrated, over a 10-month period of no practice, significant retention in all of the task components and combinations of task components measured in the standard pedestal sight manipulation test. During a 5-day relearning condition, the subjects reattained or surpassed the highest level of performance attained during 17 days of original learning in the task component, ranging (R), and in the combination performances which involved the R component. The subjects did not reattain their former level of performance in any of the tracking dimensions: azimuth (A), elevation (E), or a combination of A and E. The results suggest that the well-trained sight operator can reacquire former proficiency in a short time after return to his task and can be more proficient than the novice. (AD abstract)

1632

Jones, Marshall B. 1953
ASPECTS OF THE AUTONOMOUS PERSONALITY. I. MANIFEST ANXIETY. — Naval School of Aviation Medicine, Pensacola, Fla. Nov. 12, 1953. 4+1 p. (Project Report no. NM 001 058.25.03). AD 27 391 PB 126467

The possible correlation between authoritarianism (term describing a nonautonomous individual who surrenders his authority over himself) and manifest anxiety was investigated. The Minnesota Multiphasic Personality Inventory (MMPI) was administered to two samples of 166 and 245 Naval Aviation cadets, respectively: the first sample was given the California F Scale, Form 40-45, 39 days after the MMPI and the second sample was given the F scale one day after the MMPI. Rank rather than normal correlation was used in the statistical analysis. The distribution of F in both samples duplicated the results previously reported (cf. Hollander, E. P., 1953). The distribution was almost perfectly normal with a mean $\approx$114 and a standard deviation of 21. The distribution of the Taylor Scale was definitely skewed toward low anxiety with a median $\approx$6. A rank correlation of 0.134 was obtained in the first sample; and a correlation of 0.143 for the second sample. A significant negative correlation between manifest anxiety and personal autonomy was present in both groups tested. On an a priori basis, students with even an average amount of anxiety are not expected to enlist in Naval Aviation.

1633

Jones, Walton L. 1953
TYPICAL IMPACTS OF JET AIRCRAFT LAND CRASHES. — Jour. Aviation Med., 24 (6): 474-482. 1953. DLC (TL555.A1A4, v. 24)

Land crashes of jet aircraft with a small angle of impact usually result in minor injuries to the occupants, although the damage to the plane may be considerable. Higher speed, involving greater

vertical forces, may lead to fractured vertebrae sustained by the occupants. Under these conditions, shoulder harnesses frequently fail after absorbing much of the energy of the impact. Protective helmets may lessen or prevent head injury. Crashes with larger impact angles (30-90°) are generally fatal. Further research is needed for the development of a seat structure capable of dissipating more energy, and a cockpit capsule which would give the occupant more protection by separating him from the wreckage and possible fire.

1634

Jordi, A. U. 1953
ABSORPTION OF METHYL BROMIDE THROUGH THE INTACT SKIN: A REPORT OF ONE FATAL AND TWO NON-FATAL CASES. — Jour. Aviation Med., 24 (6): 536-539. 1953.
DLC (TL555.A1A4, v. 24)

Three case histories of methyl bromide poisoning (absorption through the intact skin) are presented since methyl bromide is still used as one of the best fire-extinguishing agents in airplanes and on airbases. The author states that the oxygen apparatus gives no adequate protection against the toxic effects. Serious symptoms appear eight hours or even days after exposure; no available means of treatment is known to prevent the course of the organic lesions.

1635

Jordi, A. [U.] 1953a
[THE EFFECT OF AIR-CONDITIONING OF NON-MILITARY AIRPLANES ON THE FATIGUE OF AVIATION PERSONNEL DETERMINED BY THE KATATHERMOMETER]. Influence de la climatisation des avions civils sur la fatigue du P. N. déterminée par le katathermomètre. — Médecine aéronautique (Paris), 8 (1): 93-95. 1953. In French. DLC (TL555.M394, v. 8)

The cooling capacity of the cabin atmosphere of DC-4s and Convairs during the Lisbon, Abadan, and New York flights was determined. The katathermometer (wet-bulb thermometer) was heated a few degrees above body temperature and placed at the height of the head of the seated subject. The time of descent of the colored alcohol column in the thermometer was measured. Cooling capacity values were calculated by the following formula:

$$\text{cooling capacity} = \frac{\text{instrument factor}}{\text{time}}$$

In the DC-4s, when the cooling capacity was satisfactory in the passengers' cabin, the cooling time increased up to 100% in the crew's compartment; the maximum was reached while crossing the desert. There the cooling time increased by more than 200% in the crew's compartment as compared with the normal time in the passengers' cabin. In the Convairs the ventilating and heating systems had to be adjusted to obtain a comfortable climate, thus reducing fatigue.

1636

Judy, C. J. 1953
A COMPARISON OF PEER AND SUPERVISORY RANKING AS CRITERIA OF AIRCRAFT MAINTENANCE PROFICIENCY. — Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base, Ill. Research Bulletin no. 53-43, Nov. 1953. iv+36 p. (Project no. 507-012-0003). AD 23 035 UNCLASSIFIED

An investigation was made of the relative adequacy of peer and supervisory rankings as criteria of aircraft maintenance proficiency. Air Force crew-chief mechanics in 20 groups at five Air Training Command bases were ranked on job know-how by their peers and supervisors and were given a basic knowledge proficiency examination. In regard to average inter-rater reliability, supervisors exhibited a significant superiority over peers in ranking the same people. In regard to the validity of peer and supervisor rankings, supervisors exhibited some superiority (not statistically significant at 0.05 level) over peers who ranked the same people. In regard to freedom from bias in peer vs. supervisory rankings on job know-how, there was a larger relationship between peer rankings and all selected variables except height. Of the extraneous variables, time in organization, age, total service, how well known, marital status, and amount of foreign duty, three (marital status, age, and how well known) were considerably more related to peer rankings than they were to supervisory rankings. The investigators selected supervisor rankings as being more practical from the standpoint of convenience and economy. (AD abstract)

1637

Käser, R. 1952
[DAMAGED HEARING THROUGH NOISE AND DETONATIONS IN INDUSTRY AND IN THE ARMY, ITS NATURE AND PREVENTION] Schädigung des Gehörs durch Lärm und Knall in Industrie und Armee, ihr Wesen und Ihre Verhütung. — Militärsanität (Zürich), 34 (10): 73-75. 1952. In German. DNLM

A brief survey is presented of occupational deafness induced by noise. In Switzerland, a thorough study of acoustic trauma has been made by L. Rüedi, W. Furrer, and collaborators (cf. Das akustische Trauma. Basel: 1947), who found that sounds of 2000 c.p.s. and above endanger the Corti apparatus and designed a protective device consisting of tightly-fitting ear covers with very fine openings on the surface. This device has been proven to provide perfect protection against explosions and detonations while preserving speech discrimination; the harmful frequencies above 2000 c.p.s. are kept out, while the lower frequencies are passed. The Lüscher and Zwislocki device is also good. However, because of its position in the ear tube, it may cause irritation. In the last years the federal military department has produced another device based on the Rüedi-Furrer principle, but introduced into the ear the same as the Lüscher-Zwislocki model. Thorough testing of the three Swiss models, and comparison with foreign devices by a commission of the Swiss Otological Society, clearly revealed the superiority of the Swiss models, because of their selective filtering action, practicality, inexpensiveness, and efficiency of the ear-plug device was confirmed.

1638

Kaplan, J., 1953
[L. E. Morehouse, C. E. Yeager, H. Haber, C. A. Tobias, and others]
PANEL DISCUSSION ON FRONTIERS OF MAN-CONTROLLED FLIGHT. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 97-104. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953.
DLC (TL670.C25, 1953)

This panel discussion included the following topics: (1) factors of fatigue, both functional and organic (discussed by L. E. Morehouse); (2) standardization of cockpit equipment for various models of aircraft (C. E. Yeager); (3) the physiological effects of zero-gravity (H. Haber); and (4) cosmic radiation hazards. Though the overall danger of cosmic radiation injury of the retina at altitudes seems to be remote, it is known that exposure to neutrons has been a cause of cataract formation. Experimentally induced cataracts have been produced in animals by exposing them to X-rays and neutrons. It is conceivable that heavy cosmic ray particles could give rise to nervous impulses, but the perception of the impulses by fliers at high altitudes will probably depend on the overall nervous activity (C. A. Tobias).

1639

Kaplan, S. J., 1953
and G. Gentry
THE EFFECT OF SUBLETHAL DOSE OF X-RADIATION UPON TRANSFER OF TRAINING IN MONKEYS. — School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-3501-0003, Report no. 4); and Univ. of Texas, Austin (Contract AF 18(600)-165). Dec. 1953. iii+8 p. AD 26 358
PB 113344

Six Macaca rhesus monkeys were trained to a high level of performance on a discrimination task. Each was then required to give evidence of a transfer of training for stimulus pairs employing a novel stimulus, in one instance, the positive stimulus (test A) and in another instance, the negative stimulus (test B). In 80 pre-radiation trials on each test during which each of the new stimuli was observed by the animal only twice, all animals exhibited a complete transfer ability. X-irradiation appeared to have no effect whatsoever on the capacity for transfer. No differences were noted between animals receiving radiation to the entire body, radiation to the whole body with the central nervous system shielded, and normal nonradiated animals. During no period following radiation were signs of malaise and other identifying radiation illness symptoms noted. These negative results summarize the effects of a sublethal dose on a reasonably high order of cognitive functions. The ability of the animal to retain mastery of a task to which little prior training has been devoted and the ability to retain and utilize in some form of conceptualization the material learned in early training suggests strongly that radiation has had no effect on the higher order processes in the monkeys studied. (Authors' summary)

1640

Kappauf, W. E., 1952
and M. C. Payne
A SELECTED, ANNOTATED BIBLIOGRAPHY ON PROCEDURES USED IN ACTIVITY ANALYSIS. — Univ. of Illinois, Urbana (Contract AF 33(038)-25726); issued by Human Resources Research Center. [Technical Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. TECH-52-8, July 1952. 10 p. (Project no. 507-011-0001). ATI 162 942
UNCLASSIFIED

This annotated bibliography comprises 22 references to recent articles, books, and reports on job analysis and related fields. The bibliography is preceded by a brief guide to the literature, arranged according to the following main categories: (1) job analysis by means of special recording equipment; (2) job analysis by means of time sampling; and (3) job analysis by means of check lists, questionnaires, etc. The arrangement of the bibliography proper is alphabetical by author.

1641

Karlin, L. 1952
REACTION TIME AS A FUNCTION OF PREPARATORY INTERVAL FOR TWO TYPES OF REACTION [Abstract]. — Amer. Psychologist, 7 (7): 264. 1952. DLC (BF1.A55, v. 7)

The relationship between reaction time (RT) and preparatory interval (PI) has been investigated mostly for the simple type of reaction; therefore it is not known to what extent one may generalize from these results to other more complex types of reaction. In this experiment, the relationships between RT and PI were compared in both simple and choice reactions in eight students. Each subject attended two sessions on different days at which either simple or choice reaction times were obtained. The preparatory stimulus, repeated for the simple reaction stimulus, was always a 500-cycle tone. In the choice reaction the subject responded by lifting the right or left finger from a twin reaction key according to whether a 200- or 1,000-cycle tone was sounded. PI's of $\frac{1}{2}$, 1, 2, 3, 4, and 8 seconds were each presented in blocks of 15 trials. All tones were equal in loudness and duration (.2 second). For simple RT the mean RT increased linearly with increasing PI. For choice RT there was a significant decrease in RT at the 1-second PI. After this, RT increased regularly with increasing PI. The important difference between the two curves was that the shortest PI used, one-half second, was optimal for simple RT while the 1-second PI was optimal for choice RT. These results suggest that the "optimal" preparatory interval is longer for the more complex type of reaction. (From the abstract)

1642

Karlin, L. 1953
THE TIME-ERROR IN THE COMPARISON OF VISUAL SIZE. — Amer. Jour. Psychol., 66 (4): 564-573. 1953. DLC (BF1.A5, v. 66)

"Time-error" is defined as the constant error resulting from the comparison of two sucessive

stimuli. The sign of the time-error is positive if the second stimulus of a pair is underestimated when compared to the first member, and negative if overestimated. The results of the present study suggest that the time-error for the successive comparison of circles becomes increasingly negative with increasing length of interpolated interval. It is pointed out that these functions are similar to those obtained in previous studies for stimuli varying in intensive magnitude. It is concluded that the function of the negatively directed time-error may be characteristic of judgments of magnitude in general. It was also found that the time-error tends to become less negative when stimulus-duration is changed from 1 to 3 seconds; there may be a tendency for this trend to reverse when stimulus-duration further increases from 3 to 5 sec. (From the author's summary and conclusions)

1643

Karpinos, B. D. 1953
EVALUATION OF THE PHYSICAL FITNESS OF PRESENT-DAY INDUCTEES. — U. S. Armed Forces Med. Jour., 4 (3): 415-430. 1953. DLC (RC970.U7, v. 4)

A profiling system was introduced by the U. S. Army in 1944, designed to evaluate the physical capacities of men entering the military service and to serve as an additional means for properly allocating Army manpower. The system is known under the term "PULHES" (composed of the initial letters of the principal factors comprised in the profile: physical capacity and stamina, upper extremities, lower extremities, hearing, eyes, and neuropsychiatric history and findings). In contrast to the Canadian system ("PULHEM"), mental and intellectual factors ("M") do not form part of the profile but are determined separately in the Armed Forces Qualification Test (AFQT), which determines the recruit's ability to absorb military training. The test therefore is merely a screening and general evaluation device and does not attempt to differentiate among the underlying causes of low mental ability. The paper discusses in detail the factors affecting profiles, the physicomental distribution of the inductees, and the principal diagnoses responsible for the functional limitations as expressed by the various profile factors.

1644

Karrasch, K. 1953
[PULSE RATE DURING PHYSICAL EXERCISE AND EXPOSURE TO EXPERIMENTAL HYPOXIA] Der Leistungspulsindex im Hypoxemieversuch. — Zeitschrift für Kreislaufforschung (Darmstadt), 42 (23-24): 899-904. 1953. In German. DNLM

The pulse rate during intensified physical exercise (riding on a bicycle ergometer) was studied under normal and hypoxic conditions. Hypoxia was induced either by inhalation of gaseous mixtures of low oxygen content, or by tightly bandaging the thorax and upper abdomen, thus reducing the vital lung capacity to one third of its initial value. The exercise was continued until exhaustion occurred (work load: 10 mkg./sec.). Results show that the pulse frequency increases (from 70 to 150 per minute) as the oxygen content of the inhaled air is diminished (from 10-5%); the degree of fatigue increases sharply, and exhaustion sets in rapidly. After cessation of hypoxia, the pulse rate shows a prolonged aftereffect. This increase in pulse rate was observed also, but to a lesser degree, during breathing of normal air with the thorax bandaged.

1645

Katchmar, L. T. 1952
REVIEW OF THE LITERATURE ON REACTION TIME. — Univ. of Maryland, College Park. Technical Report no. 5 on Indicators of Behavior Decrement, March 16, 1952. 2+11 p. (Contract DA 49-007-MD-222). AD 31 305 UNCLASSIFIED

A critical review of the literature on reaction time is presented. Some of the representative types of apparatus designed to measure reaction time are described and are generally found highly developed and standardized with acceptable reliabilities. The following recommendations are advanced: for purposes of measuring behavior decrement, standard types of reaction-time tests are of limited value due to the preparatory interval prior to presentation of the stimulus. A self-paced test, similar to the School of Aviation Medicine self-paced discrimination-reaction-time test or the Seashore serial discrimeter, should provide an acceptable indicator of behavior decrement. (Author's summary, modified) 58 references.

1646

Katchmar, L. T., 1952a
J. A. Whittenburg, and E. C. Weiss
REVIEW OF THE LITERATURE ON MENTAL WORK AND SUSTAINED VIGILANCE. — Univ. of Maryland, College Park. Technical Report no. 8 on Indicators of Behavior Decrement, March 20, 1952. 12 p. (Contract DA-49-007-MD-222). AD 31 308 UNCLASSIFIED

A critical review of the literature on mental work and vigilance (sustained attention) is presented. The main emphasis is placed on the methodology employed and the results obtained in the various experiments and studies related to behavior decrement. A coverage of the literature reveals that, while attention per se would be of limited value, mental work which has a high attentive component would serve as a satisfactory independent variable under certain conditions in the study of behavior decrement. The following factors have been shown to be related to fatigue resulting from mental work: (1) Continuous mental work produces fatigue effects which are proportional to the length, rate, and difficulty of the task. (2) Fatigue effects are manifested in three directions: feeling tone, output, and organic change. (3) Mental performance is not perfectly continuous but is interspersed with short pauses or blocks which may have a recuperative effect because they increase in length and frequency in proportion to the length and difficulty of the task. (4) Fatigue effects, developed in one mental task, transfer to other mental tasks in proportion to their similarity. (5) Recovery from fatigue effects of mental work progresses at a negatively accelerated rate, occurring most rapidly during the first few minutes. (6)

Practice tends to decrease the number of errors and blocks, while fatigue tends to increase the size and number of blocks and errors. (Authors' summary, modified)

55 references.

1647

Katchmar, L. 1953

THE EFFECTS OF STRESS, ANXIETY AND EGO INVOLVEMENT ON "SHIFT" TASK PERFORMANCE. — Univ. of Maryland, College Park (Contract DA 49-007-MD-222). Technical Report no. 22, Dec. 10, 1953. 59 p. AD 31 282

An attempt was made to investigate the effects of psychological stress on level of aspiration and on performance on a highly repetitive task which requires a shifting between two well practiced acts. The performance test employed was the Woodworth-Wells form naming and substitution test. The independent variable conditions were level of anxiety, ego-involvement, and failure stress. Performance on the test was measured by time to completion, the difference between pre- and post-stress time to completion, number of errors, and number of blocks. Two level-of-aspiration (LOA) measures were used to determine motivation: goal discrepancies and failure discrepancies. Fifty-four college students were selected for the experiment on the basis of high and low anxiety scores as measured by a modified form of the Taylor manifest anxiety index (Jour. Exper. Psychol., 44(2): 61-64, 1952). Results indicate that performance on a highly repetitive speed test of the Woodworth-Wells type shows an increasing deterioration under increasing levels of stress; and anxiety, as measured by the modified Taylor index, increases susceptibility to the effects of failure stress as defined in this study. The ego involvement instructions did not differentially affect the performance of subjects. The LOA measures were not sensitive to the independent variable conditions.

1648

Kausler, D. H. 1952

AN ANALYSIS OF CERTAIN CHARACTERISTICS OF SELF-RATINGS MADE ON A PERSONALITY RATING SCALE. — Human Resources Research Center. [Aircraft Observer Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. AO 52-7, Nov. 1952. 15p. (Project no. 506-005-0003). ATI 188278 UNCLASSIFIED

A personality rating scale consisting of ten traits was administered to four classes (two navigator and two pilot). Each student made three ratings: (1) himself, (2) the student he flew most with, and (3) one other student in the class he knew well. An analysis was made of these data in order to investigate certain characteristics of self-ratings on this scale. It was found that the rater has a tendency to exhibit as much variability in rating himself as in rating the other two people. A definite tendency also was found for the rater to avoid rating himself the lowest of the three ratings made on each trait. Relatively higher ratings were given in terms of the traits (items) "motivation" and "cooperation" by both the navigator and pilot students. In addition, relatively higher ratings were given in terms of the traits (items) "mathematical-mindedness" and "individualism" by the navigator students only. Relatively low self-ratings were given in terms of "work habits" by both navigators and pilots, whereas relatively low self-ratings were given in terms of "emergency reactions" and "response to authority" by navigator classes. Relatively low self-ratings in terms of "mathematical-mindedness" were given by members of the pilot classes. (From the author's summary)

1649

Keidel, W. D. 1952

[MEASUREMENT OF SKIN WAVE VELOCITIES INDUCED BY VIBRATORY STIMULATION IN MAN] Messung der Hautwellengeschwindigkeiten bei Vibrationsreizen am Menschen. — Pflügers Archiv für die gesamte Physiologie (Berlin), 255 (3): 213-227. 1952. In German.

DLC (QP1.A63, v. 255)

Skin areas of various parts of the human body were stimulated by vibrations at frequencies ranging from 100 to 800 c.p.s. and by ultrasonic vibrations of 57,500 c.p.s. Vibrations were recorded oscillographically at various depths under the skin surface. It was observed that wave velocities depend on the types of subcutaneous tissue, being lowest in fatty tissue (7 m./sec.), higher in muscle tissue (30-50 m./sec.), and highest in bony tissue (480-1200 m./sec.). The damping effect of the underlying tissues causes frequency reductions directly proportional to the distance from the point of stimulation. However, the wave length was found to remain constant at any given point and at any given vibration frequency. It is assumed that the perceptive mechanism may be analogous to that formulated in the "place theory" of auditory pitch discrimination, in that to each point on the skin corresponds a separate point of central perception.

1650

Kelsey, P. A., 1953

and A. I. Rawnsley

ADAPTATION OF THE EAR TO SOUND STIMULI: THE INTENSITY-TIME RELATIONSHIP. — Naval Medical Research Lab., New London, Conn. Report no. 224 (vol. 12, no. 9), May 20, 1953. iii+9 p. (Project Report no. NM 003 041.34.06). AD 24 343 UNCLASSIFIED

A study was made of the extent to which stimulus intensity and stimulus duration were interchangeable in producing subsequent shifts in auditory threshold. It was found in the adapted ear that at durations beyond 50 milliseconds and up to 10 seconds at 1000 cycles per second this interchangeability does not exist and that in the fatigued ear intensity and duration are not interchangeable unless duration is about two minutes, and intensities about 140 decibels sound pressure level. (Authors' abstract)

1651

Kemph, J. P. 1952b

G. H. Kydd, J. F. Atkinson, J. P. Reed, and F. A. Hitchcock

EFFECTS OF POSITIVE INTERMITTENT AND POSITIVE-NEGATIVE PRESSURE BREATHING

ON DOGS [Abstract]. — Amer. Jour. Physiol., 171 (3): 738. 1952. DLC (QP1. A5, v. 171)

Anesthetized dogs were given compressed air intermittently at positive intratracheal pressure for 1/2 hour. The push-pull type of breathing was similarly given for 1/2 hour. The Seeler valve was used to obtain these pressures. Simultaneous recordings of arterial, venous and intratracheal pressures were made at the beginning and end of each half-hour period. Blood gases, pH, hematocrit, and electrolytes were determined; ventilation was measured quantitatively; periodic determinations of O_2 and CO_2 in expired air were made. When intratracheal pressures of 2 to 4 mm. Hg were used intermittently and compared with similar positive pressures followed by negative pressures of 1 or 2 mm. Hg, only slight differences in blood CO_2, pH, and arterial venous pressures were noted. A comparison of intermittent intratracheal pressures of 10 mm. Hg, with push-pull pressures of +10 and -4 mm. Hg show considerable difference, and hyperventilation occurred in both cases. The arterial pulse pressure and venous pulse became greater during negative intratracheal pressure, which indicated distention of the large veins and right atrium and increased venous return. Ventilation is greater during push-pull respiration and X-rays show greater excursions of the diaphragm but no pulmonary edema. There is considerable difference in percentage of CO_2 and the curve produced by the CO_2 in expired air. Since the pH of blood became as high as 7.76 other changes produced by hyperventilation were studied. (From the authors' abstract)

1652

Kemph, J. P., 1953
B. H. Burch, F. M. Beman,
and F. A. Hitchcock
FURTHER OBSERVATIONS ON DOGS EXPLOSIVELY DECOMPRESSED TO AN AMBIENT PRESSURE OF 30 mm Hg. — In: Ohio State Univ. Studies in explosive decompression, p. 48-54. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(h)
UNCLASSIFIED

Two groups of dogs were subjected to explosive decompression: from 520 to 30 mm. Hg, and from 180 to 30 mm Hg. X-ray and fluoroscopic examinations were made while the dogs were being decompressed. Intratracheal, arterial, and venous pressures were determined. Most of the dogs survived exposures of 80 seconds or less at 30 mm. Hg atmospheric pressure; exposure times in excess of 90 seconds were not generally survived. Survival time increased, however, as the decompression range decreased. The following physical changes occurred during decompression: expansion of abdominal and thoracic gases resulted in thoracic and abdominal distention; evaporation of body fluids caused a secondary swelling in about 30 seconds following decompression. Collapse occurred in 10-20 seconds, respiration ceased in 30-60 seconds, and profuse salivation began 60-90 seconds after the onset of decompression. The arterial pressure dropped to 50-70 mm. Hg and pulse pressure disappeared within 15 seconds; there also occurred a rise in venous pressure to 35 mm. Hg within 1 minute after decompression.

1653

Kemph, J. P., 1953a
and F. A. Hitchcock
CHANGES IN BLOOD AND CIRCULATION OF DOGS FOLLOWING EXPLOSIVE DECOMPRESSION TO LOW BAROMETRIC PRESSURES. — In: Ohio State Univ., Studies in explosive decompression, p. 86-94. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(i)
UNCLASSIFIED

Reprint of the paper, Kemph, J. P., 1952.

1654

Kemph, J. P., 1953b
F. M. Beman, and F. A. Hitchcock
SUBCUTANEOUS PRESSURE DEVELOPED IN DOGS FOLLOWING EXPLOSIVE DECOMPRESSION TO 25 OR 30 mm. Hg. — In: Ohio State Univ., Studies in explosive decompression, p. 133-136. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(o)
UNCLASSIFIED

Reprint of the paper, Kemph, J. P., 1952a.

1655

Kemph, J. P., 1953c
and F. A. Hitchcock
RESPIRATORY EFFECTS OF HIGH INTRAPULMONIC PRESSURE AT A SIMULATED ALTITUDE OF 72,000 FEET (30 mm. Hg). — In: Ohio State Univ., Studies in explosive decompression, p. 197-205. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(t)
UNCLASSIFIED

Reprint of the paper, Kemph, J. P., 1953f.

1656

Kemph, J. P., 1953d
and F. A. Hitchcock
ADDENDUM TO RESPIRATORY EFFECTS OF HIGH INTRAPULMONIC PRESSURE AT A SIMULATED ALTITUDE OF 72,000 FEET. — In: Ohio State Univ., Studies in explosive decompression, p. 206-210. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(u)
UNCLASSIFIED

One dog was provided with positive intermittent intrapulmonic pressures of 80-190 mm. Hg during

explosive decompression to a simulated altitude of 72,000 ft.; an inelastic muslin binder was used as restraint. Ten dogs were given high intrapulmonic pressure with an equal amount of counter pressure in a bladder suit. Although no apparent physiological or gross pathological effects were observed after long exposures to low pressures, micropathological effects were detected when high intrapulmonic pressures were provided. Fibrotic nodules in the lungs occurred at sites of previous alveolar-septum ruptures. Scar tissue was observed in the heart, spleen, and brain resulting from multiple infarcts produced by interruption of the blood supply to these areas. The same degree of intrapulmonic pressure caused less depression of the diaphragm at 10 minutes than at 60 minutes; apparently, greater pulmonic pressures can be tolerated as the duration of exposure is increased. A properly fitted bladder suit offered better protection against high intrapulmonic pressures than did an inelastic binder. (AD abstract)

1657

Kemph, J. P., and F. A. Hitchcock 1953e

CARDIOVASCULAR EFFECTS OF HIGH INTRAPULMONIC PRESSURE AT GROUND LEVEL AND AT A SIMULATED ALTITUDE OF 72,000 FEET (30 mm. Hg). — In: Ohio State Univ., Studies in explosive decompression, p. 211-217. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(v)

UNCLASSIFIED

Dogs tolerated explosive decompression to 30 mm. Hg when intermittent high intrapulmonic pressures were applied. The optimal intrapulmonic pressures were 80-120 mm. Hg. In 20 experiments, the arterial pressure was recorded during exposure to high intrapulmonic pressures at ground level and at a simulated altitude of 72,000 ft. Simultaneous recordings of the arterial- and venous-pressure responses were made under similar conditions in 6 experiments. X-rays were taken to determine the presence of gas in the heart. In those cases in which the heart stopped beating, the effectiveness of intermittent high intrapulmonic pressures ("cardiac massage") in maintaining circulation was also evaluated. Changes which occurred in the contour of the arterial pulse wave during the application of high intrapulmonic pressure or during exposure to 30 mm. Hg are analyzed in detail. Both the blood-pressure response and X-ray findings indicated a similarity between the effects of explosive decompression and the application of high intrapulmonic pressure. The use of intermittent high intrapulmonic pressures is considered an effective method of cardiac massage. (From the AD abstract)

1658

Kemph, J. P., and F. A. Hitchcock 1953f

RESPIRATORY EFFECTS OF HIGH INTRAPULMONIC PRESSURE AT A SIMULATED ALTITUDE OF 72,000 FEET (30 mm. Hg). — Jour Aviation Med., 24 (1): 5-13. 1953.

DLC (TL555.A1A4, v. 24)

Respiratory effects and survival times were studied on dogs exposed to an ambient pressure of 30 mm. Hg and intermittently supplied with oxygen at high intrapulmonic pressures both with and without restraint to distention of the thorax. The following results were obtained: (1) When oxygen was supplied at intrapulmonic pressures of 60 to 80 mm. Hg with no resistance to distention of the thorax, survival time was only slightly increased and aero-embolism frequently occurred. The latter may be a major factor in causing death. (2) When resistance to thoracic distention was provided, both the survival time and the tolerance to high intrapulmonic pressure was greatly increased. Intrapulmonic pressures as high as 250 mm. Hg were tolerated, but the optimal effect was produced with pressures between 80 to 120 mm. Hg. (3) There was a direct correlation between the amount of resistance to distention of the thorax and abdomen provided, the tolerance to high intrapulmonic pressures, and the survival time at ambient pressure of 30 mm. Hg. (4) Intrapulomic pressures of 40 to 50 mm. Hg were required to prevent of obliterate vapothorax. This indicated that the pressure exerted by gas withing the intrapleutal space was between 35 and 45 mm. Hg. (5) When oxygen was supplied intermittently at intrapulmonic pressures of 80 to 120 mm. Hg, the blood was appreciably oxygenated and there was marked reduction in the partial pressures of CO_2, N_2, and water vapor. (Authors' summary)

1659

Kennedy, J. L. 1952

SOME PRACTICAL PROBLEMS OF THE ALERTNESS INDICATOR. — In: Ross, S., Report on "Symposium of Fatigue" ..., p. 19. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309

UNCLASSIFIED

Experiments leading toward the development of an "alertness indicator" were prompted by reports of German physiologists at the end of World War II. It was stated that a portable alertness meter had been developed based on changes (decrease) in alpha rhythm. Initial experiments by the author employing electroencephalographic recordings were abandoned because the range of individual differences was very great in the eyes-open vigilance situation; also, normal individuals did not exhibit an alpha rhythm. Electromyograms from biceps and triceps muscles likewise remained unsuccessful, since resting tonus could not be studied with surface electrodes. However, when the electrodes were placed on the pinna of the ear, muscle spikes and readiness to respond were found to be correlated. Later, electrodes were placed on the forehead over the supraorbital ridges (using rubber electrodes in salt solution). Combined with a stimulus-presentation device, the apparatus resulted in an automatic electronic monitor. Reaction time

was used as a measure of the sensitivity of the subject. Practical problems related to an alertness indicator are discussed.

1660

Kent, P. R., and J. H. Steeve 1953
CONVERGENCE INSUFFICIENCY: INCIDENCE AMONG MILITARY PERSONNEL AND RELIEF BY ORTHOPTIC METHODS. — Military Surgeon, 112 (3): 202-205. 1953. DLC (RD1.A7, v. 112)

Statistics are presented which indicate that one of every 20 to 32 patients referred to the refraction clinics of two naval hospitals had convergence insufficiency accompanied by symptoms. When this condition was present it was particularly productive of symptoms while engaged in nearpoint tasks. The average individual afflicted revealed, clinically, exophoria at distance slightly above normal and considerably above normal at near point. All were marked by low prism convergence at near point when compared with the phoria at the same distance. The symptoms complained of were not unlike those occasioned by an uncomplicated refractive error. A simple method of orthoptic training employing loose prisms is described. The importance of considering the alignment of the visual axes of the two eyes and the associated fusional adjustments is re-affirmed. Among military personnel those who may be benefited by prism convergence orthoptic training are not numerous. It is concluded, however, that their numbers are sufficient to warrant the application of orthoptic techniques when indicated. (From the authors' summary and conclusions)

1661

Kesselring, F., and W. Koella 1952
[STEREOSCOPIC SIGHT DURING HYPOXIA] Das stereoskopische Sehen bei Hypoxia. — Arbeitsphysiologie (Berlin), 14 (6): 442-447. 1952. In German. DNLM

Stereoscopic vision at low atmospheric pressures was studied in 11 students by means of a three-rod stereometer. The measurements were made at 450, 4000, and 6000 m. simulated altitude. Tabulated results showed the greatest deviations at 6000 m., and lesser deviations (as compared to the controls) at 4000 m. and 450 m. Hypoxia is considered to be the chief cause of these phenomena. To some extent, the symptoms may be the result of psychological reactions to hypoxia, causing a weakening of the functions in the retina and in the eye muscles. It has been shown that anoxia alone, at normal atmospheric pressure, causes similar functional responses.

1662

Kettler, A. H., L. J. Flodman, D. W. Martin, and M. L. Graham 1952
A HIGH INTELLIGIBILITY INTERPHONE SYSTEM FOR USE IN MILITARY AIRCRAFT. — Jour. Acoust. Soc. America, 24 (4): 450. 1952. DLC (QC221.A4, v. 24)

Abstract of a paper presented at the 43rd Meeting of the Acoustical Society of America at New York, N. Y., May 8-10, 1952:

"At the end of World War II the introduction of a wide variety of extremely noisy aircraft flying very long missions at high altitudes had placed demands on interphone communications that the old system could not meet. Beginning in 1947 an entirely new system was developed with the close and active cooperation of the Air Material Command (now Wright Air Development Center). The criterion of performance is the word articulation of the entire system. New microphones, headsets, loudspeakers, amplifiers, control panels, and power supplies were developed. The resulting system has a frequency range of 200-6000 c. p. s. It is very flexible, extremely comfortable, and provides high word articulation scores in 120-db. sound fields at altitudes up to 35,000 feet."

1663

Keys, A. 1952
FATIGUE AND WORK CAPACITY IN STARVING MEN. — In: Ross, S., Report on "Symposium of Fatigue" ..., p. 5-6. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

The author reviewed some of the findings on the Minnesota starvation study as related to the problem of work capacity under the semi-starvation conditions of the experiment (N = 32). No changes on test performance in vision (acuity, color, dark), hearing (all frequencies), or intelligence (arithmetic, code, vocabulary, memory, or reasoning) were found. The subjects were apparently "unwilling to maintain their active intellectual life, but could be brought back." Psychomotor changes, although not apparent to the experimenters, were found on testing. Strength tests showed major changes (-30%). Psychological changes were clearly apparent and important. Apathy and depression characterized the subjects. Appeals to sympathy, pride, patriotism, sex, did not work. Food (or more food) appeals did stimulate action. The effects of fasting are quite different. Coordination suffers greatly, but brief endurance tasks reveal no change. (S. Ross's summary)

1664

Khaitun, S. E. 1953
[CONDITIONED REFLEXES AS A METHOD OF OBJECTIVE DETERMINATION OF HARD OR KEEN HEARING] Uslovnye refleksy kak metod ob"ektivnogo opredeleniя glukhoty i ostroty slukha. — Vestnik oto-rino-laringologii, (Moskva) 15 (4): 76. 1953. In Russian. DNLM

A method of determining hearing thresholds by means of conditioned reflexes is described. The subject simultaneously hears a buzzer and feels pain from a slight electric shock. A conditioned reflex is established when the buzzer is sounded alone: if the subject hears it, he pulls his hand back although he feels no pain, if the hand is not pulled back, it means that the sound has not been heard. The sound of the buzzer can be decreased at will by varying the distances without the subject being aware of it.

1665

Khechinashvili, S. N. 1953
[SOME RESULTS OF EXPERIMENTAL STUDY OF THE VESTIBULAR FUNCTION] Nekotorye resul'taty experimental'nogo issledovaniia vestibuliarnoĭ funktsii. — Trudy Instituta Fiziologii Akademii Nauk Gruzinskoĭ SSR (Tbilisi), 9: 25-41. 1953. In Russian. DLC (QP1.A4, v. 9)

Unconditioned and conditioned reflex reactions in response to vestibular stimulation were studied in cats, dogs, and rabbits. The animals were made to keep their equilibrium in a suspended box, and a continuous electrical current or short electrical impulses were applied. The results showed that vestibular reflexes may be elicited by rhythmical stimulation lasting 0.02 to 0.2 milliseconds. Stimulation by continuous current elicited responses during the whole duration of the current. The lability of the vestibular nerve and the duration of latency periods of the vestibular reflexes are not different from the values observed during stimulation of other afferent nerves. Conditioned reflexes in response to vestibular stimulation appear after short latency periods (not over 0.2 seconds). Vestibular ataxia only (general disturbance of equilibrium) is preceded by relatively long latency periods. Therefore, there is no reason to separate the vestibular reflexes from the group of somatic motor reactions and to relate them to vegetative reflexes. Even the weakest vestibular stimulations are reflected on the cerebral cortex (EEG). The vestibular function has a cortical representation which increases in importance with the animal's phylogenetic level of development.

1666

Khilov, K. L. 1952
[THE CEREBRAL CORTEX IN RELATION TO THE VESTIBULAR ANALYSOR] Kora golovnogo mozga v funktsii vestibuliarnogo analizatora. 84p. Moskva & Leningrad: Medgiz, 1952. In Russian. DNLM (WV250, K45k)

Autonomous reactions to vestibular stimulation (rotation) were studied. Electrocardiograms were taken, blood pressure was determined, and skin temperature, amount and pH of salivary secretion, amount and HCl content of gastric juice, and changes in perspiration and in respiratory functions were measured. Nystagmus and general vestibular autonomous reactions were found to vary depending on the subject's condition (before or after meals, before or after physical work). Relative thresholds of receptor sensitivity in the semicircular canals showed noticeable variations in 50 subjects. During vestibular stimulation, the electrical activity of the brain increased but decreased upon administration of chloral hydrate. According to autonomous reactions, individuals were grouped as follows: (1) the stable, (2) the "sympathetic" (secretory and cardiovascular functions decreased) and (3) the "parasympathetic" (secretory and cardiovascular functions increased) types. In hypoxia these reactions changed except in a few individuals of the stable type. This is explained by differences in the coordinating function of the cortex. Impairment of this function elicited violent vestibular reaction of the parasympathetic type which could be prevented by administration of chloral hydrate before rotation. Establishment of a conditioned salivary reflex by simultaneous vestibular and olfactor stimulation indicated tha influence of olfactory stimulation on the vestibular autonomous mechanism. An analysis of the results shows the influence the cerebral cortex exerts on subcortical vestibular-collector neurones.

1667

Kimble, G. A. 1952
TRANSFER OF WORK INHIBITION IN MOTOR LEARNING. — Jour. Exper. Psychol., 43 (5): 391-392. 1952. DLC (BF1.J6, v. 43)

Two groups of 15 male subjects were run under two different conditions on the pursuit rotor, which consisted of a phonograph turntable carrying a brass disc at its outer perimeter — the object being to keep a stylus in contact with the brass disc as the turntable spun. Each group received 60 10-sec. trials. For Group I, half of these were massed trials with the nonpreferred hand, and half were massed trials with the preferred hand after a 5-min. rest. For Group II, the practice arrangement was the same except that no rest between the two groups of trials was allowed. From the beginning of the second practice session, Group II was significantly inferior to Group I. This fact suggests that the decremental effect of massed practice transfers to response systems other than those specifically exercised in the generation of the decrement. This generality argues against the position that the decrements known to result from massed practice in motor learning are localized muscle fatigue and nothing else. (Author's abstract, modified)

1668

Kimeldorf, D. J., 1953
and B. D. Newsom
THE SENSITIVITY OF IRRADIATED RATS TO CONDITIONS OF LOW OXYGEN TENSION AT REDUCED BAROMETRIC PRESSURES. — Jour. Aviation Med., 24 (1): 57-62. 1953. DLC (TL555.A1A4, v. 24)

Same as the report, Kimeldorf, D. J., 1952a.

1669

Kislîakov, V. A., 1953
and R. L. Sheikina.
[A METHOD OF STUDYING THE INFLUENCE OF THE VESTIBULAR APPARATUS ON HIGHER NERVOUS ACTIVITY] Metodika izucheniîa vliîanii s vestibuliarnogo apparata na vyshuîu nervnuîu deîatel'nost'. — Fiziologicheskiĭ Zhurnal SSSR (Moskva & Leningrad), 39 (4): 486-490. In Russian. DNLM

The influence of vestibular stimulation on the higher nervous functions of dogs was studied using conditioned salivary secretion as an indicator. A chamber containing the experimental animal was placed on a hand-operated centrifuge. Conditioned

food stimulation was applied 20 seconds after rotation. Results showed a decrease in the positive conditioned reflex and more extended latent periods indicating inhibition of conditioned reflex activity. The author concludes that the study of conditioned vestibular reflexes in dogs, in conjunction with established conditioned food reflexes, enables us to study the complex dynamics of basic nervous processes of stimulation and inhibition and to observe the interaction between the cerebral cortex and the vestibular apparatus.

1670

Kislíakov, V. A. 1953a
[ON CONDITIONED MOTOR REFLEXES FORMED ON THE BASIS OF THE REACTION INDUCED BY ROTATION OF THE ANIMAL] Ob uslovnykh dvigatel'nykh refleksakh, obrazovannykh na osnove reaksiĭ, vyzvannykh vrashcheniem zhivotnogo. — Trudy Instituta Fiziologii imeni I. P. Pavlova (Moskva-Leningrad), 2: 69-75. 1953. In Russian. DNLM (W1. AK6895, v. 2)

Three dogs were placed in a hand-rotated, double-walled box, in which flat rubber bulbs transmitted the animals pressure against the wall to a recording device. The centrifugal force acted always in a clockwise direction. A bell served as a conditioned stimulant. In some tests the animal was blindfolded. Results showed that a conditioned motor reflex can be established in response to rotation; it consists in the animal's pressure to the left or to the right wall (less often) of the box. Exclusion of the visual analysor induced a change in the direction of the conditioned motor-reflex reaction by increasing the percentage of motor reaction to the right and decreasing it to the left. After removal of the bandage from the eyes, the reaction to the right remained predominant. Rotation induces the stimulation of the vestibular analysor, the proprioreceptors, the visual and skin analysors etc., which act upon each other during the rotation and, especially, through the medium of temporary links — the conditioned reflexes.

1671

Klare, G. R., 1953
L. M. Gustafson, and J. E. Mabry
THE READING INTERESTS OF AIRMEN DURING BASIC TRAINING. — Univ. of Illinois, Urbana. (Contract AF 33(038)-25726); and Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base Ill. Research Bulletin no. 53-44, Nov. 1953. iii + 10p. (Project no. 507-011-0001). AD 20 485
PB 117349

A check list developed by Waples, D. and Tyler, R. W. (What People Want to Read About, Univ. of Chicago Press, Chicago, 1931) was administered to 398 Sampson Air Force Base Basic airmen in an effort to investigate reading interests. The check list covered the range of nonfiction reading interests (poetry, novels, short stories, how to do it books were excluded from the list). The results are tabulated according to the ranking of 117 statements in the order of most to least interesting. The study indicates that the nonfiction reading interests of male basic, airmen are fairly stable.

1672

Klemmer, E. T., 1953
and P. F. Muller
THE RATE OF HANDLING INFORMATION: KEY PRESSING RESPONSES TO LIGHT PATTERNS. — Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memo Report no. 34, March 1953. v+11 p. AD 11 866
PB 113179

The rate of transmitting information (TIR) was studied in relation to (1) a varying rate of stimuli presentation (SR) and (2) a varying location (1 to 5 places) of stimuli in the field. Patterns of lights, programmed by a teletype transmitter, were presented at a regular frequency and four subjects responded by pressing corresponding sets of telegraph keys. Increasing the SR increased the TIR to peaks between 2.4 and 2.5 stimuli/sec., followed by large decreases in all but the 1-location test which had a 3.7-stimulus/sec. peak. Increasing the number of possible bulb locations from 1 to 5 more than tripled the TIR and increased the reaction time nonlinearly in the 2- to 5-stimulus/sec. range. Reaction time was not a function of SR. The SR at which the maximum TIR occurred was close numerically to the reciprocal of the average reaction time. The TIR was no greater when forcing the subject to respond than when he forced himself in self-pacing tests. (AD abstract)

1673

Klemmer, E. T., 1953a
and F. C. Frick
ASSIMILATION OF INFORMATION FROM DOT AND MATRIX PATTERNS. — Jour. Exper. Psychol., 45 (1): 15-19. 1953.
DLC (BF1. J6, v. 45)

Stimuli consisting of one or more dots within the outline of a square were flashed on a projection screen for .03 sec. The 25 subjects reported the positions of the dots by making marks in corresponding positions on answer sheets printed with the outline of a square and containing internal grid lines. The data were scored in terms of the amount of information successfully transmitted by the subject from the screen to his answer sheet. The subjects transmitted a maximum of 4.4 bits of information about the position of a single dot in a square from a .03-sec. exposure. The information transmitted increased with the number of dots used to at least 6.6 bits per exposure for four dots. Combining the one-, two-, three-, and four-dot slides into a single series did not result in less accuracy than when each number of dots was shown separately. Because of the increased number of alternatives, however, the information transmitted increased to 7.8 bits per exposure. (From the authors' abstract)

1674

Kline, R. F., and H. C. Dyme 1952a

EFFECT OF DIET UPON FOOD AND WATER INTAKE DURING A SURVIVAL PERIOD UNDER TEMPERATE CONDITIONS. — Federation Proceedings, 11 (1[I]): 84-85. 1952.
DLC (QH301. F37, v. 11)

In basic studies of physiological relationships for use in formulating survival ration requirements, experiments were conducted to determine the effect of various dietary regimens on water consumption and fuel intake of rats over a 14-day period. Water consumption on carbohydrate diets was found to be fairly low and in some cases less than in starving controls. On a fat regimen the water intake was also low. The water intake on a protein diet was high compared to the water consumption on a balanced ration. The fuel intake of rats with free access to water when on a diet consisting of carbohydrates was excessively high as compared to the intake of animals on fat or on protein. Thus it appears that carbohydrates and fats are preferable components for single-constituent diets in situations where water supply is restricted; while the feeding of protein under such conditions is contra-indicated. Furthermore, animals subsisting on single-constituent fat or protein regimens restrict their food intake while animals on carbohydrate regimens markedly increase their food intake. (Authors' abstract)

1675

Knoell, D., R. S. French, and G. Stice 1953

CRITERIA OF B-29 CREW PERFORMANCE IN FAR EASTERN COMBAT. I. RATINGS. — Human Resources Research Center. Combat Crew Training Research Lab., Randolph Air Force Base, Tex. Technical Report no. 53-32, Oct. 1953. vi+22 p. (Project no. 511-023-0001). AD 20 488
PB 116577

Data on combat performance were obtained for B-29 crews initially trained at Randolph Air Force Base. Ratings of performance of the crew as a whole were obtained from the officers for 98 crews on 9 different items; ratings on 8 items of individual performance were obtained for members of the same crews from the officers; and the ground crews of 76 aircraft were asked to evaluate their flight crews on a questionnaire involving 16 ratings. Analysis of the various ratings in relation to length of combat assignment indicated that the effects of length of assignment appeared negligible after the first three months. Analysis of intercorrelations among the different ratings indicated correlations between superiors' ratings of crews and the individual ratings. Ratings by ground crews did not correlate significantly with anything else. (From AD abstract)

1676

Knowles, W. B., W. D. Garvey, and E. P. Newlin 1953

THE EFFECT OF SPEED AND LOAD ON DISPLAY-CONTROL RELATIONSHIPS. — Jour. Exper. Psychol., 46 (2): 65-75. 1953.
DLC (BF1.J6, v. 46)

The experiments reported in this paper were designed to demonstrate (a) interactions between three displays (light matrix, window, and auditory) and three push-button controls (matrix, row and column, and double column); (b) the effect of altering the size of four of these combinations upon their efficiencies; (c) the effect of speed upon accuracy of performance for each of the four combinations in two sizes. The results showed: There were significant interactions between the controls and displays. Altering the size of the combinations did not alter the display-control relationships appreciably. Significantly more information per second was transmitted on the smaller matrix-matrix combination. Under the forced-pacing conditions the error vs. speed trends for the various combinations were different; performance deteriorated less on the matrix-matrix combinations. Presenting information at equivalent rates on the two forms of the same combination did not lead to equivalent error functions on the matrix-matrix and the window-row and column combinations. Performance in the self-pacing mode of operation was superior to performance in the forced-pacing mode. (Authors' abstract, modified)

1677

*Kolchinskaia, A. Z. 1952

[ON THE INFLUENCE OF OXYGEN INSUFFICIENCY UPON THE HIGHER NERVOUS ACTIVITY OF MAN] O vliîanii nedostatka kisloroda na vysshuiu nervnuíu deíatel'nost' cheloveka. — In: Kislorodnaiâ terapiia i kislorodnaíâ nedostatochnost' p. 21-28. Kiev, 1952. In Russian.

Central nervous and cerebral functions were studied in men under conditions of anoxic anoxia during an ascent of Mount Kazbek (16, 541 ft.) and in the barochamber. At lower altitudes, during the Kazbek accession, the speed of speech increased by 30%; speech reactions diminished qualitatively, and latency periods shortened; motor reactions were accelerated, and their accuracy diminished; speech articulation worsened. At high altitudes the speed of speech slackened below normal; speech reactions worsened in quality, and latency periods lengthened; movements slowed down below normal, and coordination deteriorated. Inhibitory processes were the first to be affected by hypoxia; at 15, 000 ft. all types of inhibition (conditioned, differentiation, and retarded) were generally disturbed. An examination of the oxygen content in the blood showed that the degree of hypoxemia varied in the subjects. The greatest disturbances in the higher nervous activity were found to coincide with the highest degree of hypoxemia. Exposure to a simulated altitude of 27, 000 ft., while breathing through an oxygen mask, did not cause considerable changes in the higher nervous activity, except for a slight disturbance in differentiation inhibition. This led to the conclusion that lack of oxygen is the only cause of higher

central nervous disturbances at high altitudes. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiia (Moskva), 1954 (17): 37-38. DNLM (ZW1. QS729)]

1678

*Kolpakov, E. V., 1952
and N. S. Ozadovskaia
[THE INFLUENCE OF HYPOXIA ON THE REPRODUCTIVE SYSTEM OF YOUNG AND OLD RATS] Vliianie gipoksii na reproduktivnuiu sistemu molodykh i starykh krys. — In: Kislorodnaia terapiia i kislorodnaîa nedostatochnost', Kiev, 1952, p. 102-109. In Russian.

Experiments were made on 45 to 50-day-old (sexually immature), 3- to 4-month-old (mature) and 1.5-year-old white rats, subjected to interrupted exposures to simulated altitudes of 8500-9000 m. 6 hours daily for 3 weeks. The seminal vesicles were excised in the control males before, in the experimental animals after experimentation, weighed, examined histologically, and compared. Results showed that the sex organs of old males had become atrophied and sterile. The young immature animals continued to grow and reached sexual maturity, but the growth of their seminal vesicles was retarded. However, the degeneration in the spermatogene tissue was not as pronounced as in the old rats. Intrascrotal injection of hypophysial extract (0.2 ml.) could not prevent the degenerative symptoms completely. Methylthiouracil (mixed into the food of adult rats, 20 mg. per head), which blocks the thyroid function and lowers the metabolism and the central nervous stimulation capacity, preserved the spermatogenetic elements to a certain extent from degeneration. Ovaries proved more resistant, in conformity with the greater resistance of female rats to hypoxia. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (17): 37. DNLM (ZW1. qS729)].

1679

Koolstra, J., 1953
and P. M. van Wulfften Palthe
[FAINTING DURING THE MEDICAL EXAMINATION OF AVIATORS] Flauwvallen tijdens vliegerkeuringen. — Aeromedica acta (Soesterberg, Netherlands), 2: 223-241. 1953. In Dutch, with English summary (P. 233, 241). DNLM

Five cases of fainting during the medical examination of pilots are discussed. Since the etiology and the clinical symptoms of these cases vary greatly, a thorough investigation of the cardiovascular system is indicated. The pulse-blood pressure diagram (after 20 deep genuflexions in 20 seconds) gives a good indication of circulatory and related autonomous nervous functions. Pilots of the sympatheticotonic type do not faint easily. Emotional disturbances, usually triggered by some trivial reason, are the primary cause of the so-called psychogenic fainting. On the other hand, loss of consciousness may be caused by hypoxia of the upper brain stem cells (such hypoxia, however, is not due to hypoxemia or hemodynamic disturbances). Conditions, such as lack of nourishment, fever, fatigue, extended forced immobilization, concussions, and, especially, emotional hyperventilation may oversensitize the brain and cause faintings. Olfactory stimuli or anticipation of pain or discomfort ("the medical situation") often furnish the triggering stimulus. Fainting usually occurs in otherwise robust and mentally stable subjects, who are normally not prone to it in situations of real danger or in states of vitally important emotions. The carbohydrate metabolism and its influence on brain sensitivity is a factor to be considered. Induced hyperglycemia has proven to be of value as a preventive.

1680

Koomen, M., 1953
R. Scolnik, and R. Tousey
MEASUREMENT OF ACCOMMODATION IN DIM LIGHT AND IN DARKNESS BY MEANS OF THE PURKINJE IMAGES. — Jour. Optical Soc. Amer., 43 (1): 27-31. 1953. DLC (QC350.O6, v. 43)

The state of focus of the eye in dim light and in total darkness was investigated by photographing the Purkinje images of a double aperture placed over a high-speed flash lamp. Measurement of the photographed images showed that all subjects, when viewing a dim scene, remained focused for far vision. By subjective test, however, these subjects were myopic under the same conditions of dim light. The experimental results thus favor the theory that "night myopia" is a result of the aberrations of the eye and is not due to accommodation. The flash photographs taken in total darkness showed that three subjects remained focused for far vision; the fourth subject sometimes accommodated by amounts varying between 0.5 and 1.5 diopter. (Authors' abstract)

1681

*Kopytin, B. M. 1952
[ON THE PATHOGENESIS OF KETOSIS IN HYPOXIC STATES] K patogenesu ketoza pri gipoksicheskikh sostoîaniîakh. — Nauchnye raboty aspirantov i klinicheskikh ordinatov Tsentral'nogo Instituta Usovershenstvovaniîa Vracheĭ (Moskva), 1: 30-38. 1952. In Russian.

When rats were exposed to anoxia and to reduced barometric pressure down to 248 mm. Hg, ketone formation was found to increase 63% as compared to controls. Comparing liver sections of rats starved for 48 hours and kept in an atmosphere containing 10% oxygen to those of rats kept in 100% oxygen, a decrease in ketogenesis was observed in the hypoxic cases. Therefore liver hypoxia cannot be considered to be the cause of ketone hyperproduction, for which a sufficient oxygen supply is indispensable. Increased ketogenesis in the liver coincides with a decrease in glycogen and accumulation of fat in the liver. Insulin has an antiketogenetic action, but other hormones exert no influence on ketogenesis. The observation that ketogenesis increased in the liver after hypoxia during narcosis induced the author

to conclude that: (1) the nervous mechanisms regulating the development of ketosis are situated in the subcortical centers; and (2) ketosis is an adaptative reaction of the organism, since ketones are easily oxydizable, energy-providing substances. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (19): 100. DNLM (ZW1.qS729)]

1682

Kravkov, S. V. 1952
[THE INFLUENCE OF PROSERINE AND ESERINE ON CONE SENSITIVITY OF THE EYE (ON THE CHARACTERISTICS OF THE VARIOUS COLOR-SENSITIVE MECHANISMS OF THE VISUAL ANALYSOR)] Vliîanie prozerina i ezerina na kolbochkovuîu chuvstvitel'nost' glaza. (K kharakteristike osobennosteĭ razlichnykh tsvetoreagiruîushchikh apparatov zritel'nogo analizatora). — Problemy fiziologicheskoĭ optiki (Moskva), 10: 5-15. 1952. In Russian. DNLM (W1. PR5815, v. 10)

Approximately 200 experiments were made on 9 normal individuals to determine the relationship of the various color-sensitive mechanisms of the visual analysor and the acetylcholine content of the organism. Examinations were made in the foveal region. Neostigmine (proserine, 0.5%, 3-4 drops) or physostigmine (eserine, 1, or 3-4 drops at 0.5%) were injected into the conjunctival sac and sensitivity was tested to wave lengths of 425 to 700 mμ. Proserine increased the sensitivity of foveal vision in over 70% of the cases to all the spectral regions (25-40 min. after injection). Eserine (3-4 drops) increased foveal sensitivity to short-wave (green), and decreased it to long-wave (red) stimulation. Injection of 3-4 drops of 0.5% eserine into one eye affected the sensitivity of the other, which indicates a possible participation of the central nervous system in the regulation of acetylcholine content in the nerve cells of the visual analysor. The results confirm the theory that the sensitivity of color-sensory mechanisms, especially in response to green and red rays, are changed reversely to the acetylcholine content of the nervous cells. An increase in acetylcholine content usually decreases eye sensitivity in response to green and increases it to red.

1683

Kravkov, S. V. 1953
[ON THE COLOR ADAPTATION OF THE EYE] O tsvetovoĭ adaptatsii glaza. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 8: 69-74. 1953. In Russian.
DNLM (W1. PR5815, v. 8)

A brief review of studies by various Russian authors on retinal adaptation to color leads to the conclusion that color adaptation of the eye influences the condition of the mediators (intermediary neurons). This condition can therefore be altered by the spectral composition of the light which hits the eye. Red and green light in particular elicit apparently opposite changes in the acetylcholine content of the eye.

1684

Krop, S. 1953
THE TOXICOLOGY OF HYDRAZINE—A REVIEW. — Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 30, Aug. 1953. 9 p. AD 21 047 UNCLASSIFIED

The toxic effects of hydrazine on the central nervous system, heart and circulatory system, gastrointestinal tract, liver, and kidney, and effects on the metabolism are briefly reviewed. Vapor inhalation and liquid eye and skin contact are the major routes for injurious exposure, and effects may be local, systemic, or both. Prompt flushing of exposed areas with water will reduce the hazard of alkali-like burns. Convulsions characteristic of acute intoxication may be controlled by use of barbiturates. Oxygen inhalation is advised in case of dyspnea or other signs of pulmonary damage.

1685

Krotova, M. I. 1952
[TREATMENT WITH NICOTINIC ACID OF NOISE-EXPOSED INDUSTRIAL WORKERS WHOSE HEARING HAS BEEN IMPAIRED] Lechenie nikotinovoĭ kislotoĭ narushenii slukhovoĭ funktsii u lits rabotaiushchikh na shumnykh proizvodstvakh. — Vestnik oto-rino-laringologii, (Moskva), 14 (2): 35-38. 1952. In Russian.
DNLM

Thirty male and female workers employed in noisy industries, 30 to 50 years of age (4 of them above 50), 21 of whom had been on job for over 10 years, underwent oto-laringological examination. Only 7 revealed normal otoscopic findings; the others manifested symptoms of catarrhal or adhesive otitis. The hearing of all the subjects was bilaterally impaired. In 9 cases the deficiency was confined to the high frequencies, in 21 it existed at all frequencies. Some workers had noticed a decrease in working capacity, rapid fatigue, and "heaviness in the head"; 20 complained of constant noise in the ears (tinnitus). Examination was made by whispered speech and audiometrically. Nicotinic acid was injected intravenously (15 doses of 20 to 50 mg.), and work was continued under the same noisy conditions. Improvement of hearing resulted in 22 cases; tinnitus disappeared in 2 cases, decreased in 6, and persisted in the others. The over-all condition and working capacity improved, and the sensation in the head disappeared. The improvement was permanent as confirmed by observation of 13 workers two-and-a-half months after the treatment.

1686

Krueger, H. 1952
ALVEOLAR CARBON DIOXIDE PRESSURES DURING THE RESPIRATORY CYCLE IN EXERCISE [Abstract]. — Amer. Jour. Physiol., 171 (3): 740-741. 1952. (DLC (QP1. A5, v. 171)

In some experiments of C. G. Douglas and J. S. Haldane (Jour. Physiol. (London), 45 (4): 235-238.

1912), during severe exercise leading to a respiratory minute volume of 60,900 ml. at a rate of 19.5/min., the pressure of carbon dioxide in the alveolar air sampled at the end of expiration was 43.5 mm. Hg. The tidal air can be calculated to have been 3123 ml. and the dead space 1117 ml. Carbon dioxide elimination was approximately 39.8 ml./sec. or 122.4 ml. per respiratory period and approximately 61.2 ml. for the period of inspiration. During the initial stage of inspiration carbon dioxide in the dead space at the end of expiration re-enters the alveoli and some is added from the blood. The volume of air in the alveoli is then 1500+189+1117 or 2806 ml. from the sum of the residual air, the unused fraction of the expiratory reserve, and the dead space air. Residual air was taken as 1500 ml., expiratory reserve and inspiratory reserve as 1500 ml. each and resting tidal air as 500 ml. For severe exercise, the negligible residual reserves were evenly divided between inspiration and expiration to yield the figure of 189 ml. Carbon dioxide added from the blood during return of alveolar air from the dead space was about 1/3 of 61.2 ml. and would raise the carbon dioxide pressure to 48.7 mm. Hg. At the end of inspiration the air from the exterior would have diluted the alveolar air and the pressure would have dropped to 2806 X 43.5/4810 from dilution, but would have increased 61.2 X 713/4810 by the addition of carbon dioxide from the blood. The carbon dioxide pressure at the end of inspiration would thus be 34.5 mm. Hg. (From the abstract)

1687

Kryter, K. D. 1952b

NOISE SAFETY CRITERIA. — A. M. A. Arch. Indus. Hyg. and Occupational Med., 5 (2): 117-120. 1952. DLC (RC963.A14, v. 5)

Consultations with industrial workers and a review of the pertinent literature led to the following conclusions: (1) prediction of noise damage can only be effected following an analysis of the total noise spectrum; (2) voice communication at speech level is good as long as background noise does not exceed 40 decibels at frequencies up to 2,000 cycles per second; (3) the maximum safe intensity for conditions of unlimited exposure is 35 db. (below 1,000 c.p.s. and above 3,500 c.p.s. this value can probably be increased); and (4) experienced workers accustomed to noise conditions can stand noises as high as 110 db. without suffering permanent injury.

1688

Kudrîavtsev, P. N. 1952

[NEW TABLES OF WORDS FOR WHISPER ACOUMETRY] Novye tablitsy slov dlîa shepotnoĭ akumetrii. — Vestnik oto-rino-laringologii (Moskva), 14 (4): 28-33. 1952. In Russian. DNLM

An experimental analysis of loud and whispered speech (phonemes, numbers, and words from different tables) was carried out in a sound-proof chamber. The sound was received by a microphone at an established distance from the subject. The author concludes that whisper acoumetry is still very important for personnel-selection purposes, despite the availability of electro-acoustical measuring devices, because it permits the determination of such variations among words which the modern electro-acoustical devices do not register. A word table is discussed, set up by Prof. Volîachek, which is found to be fundamentally correct, but does not contain words characterized by frequencies of 750 to 1400 c.p.s. The author has endeavored to complete Prof. Volîachek's table with the missing words.

1689

Kuprianov, V. V. 1953

[INTEROCEPTORS DURING OXYGEN INSUFFICIENCY] Interoceptory pri kislorodnoĭ nedostatochnosti. — Arkhiv patologii (Moskva), 15 (2): 15-24. 1953. In Russian. DNLM

The interoceptors of extra-organic sections of pulmonary blood vessels, especially of the pulmonary vein, were studied in 24 cats and 1 dog subjected to (1) stenosis induced by tracheal obstruction, (2) exposure to a simulated altitude of 33,000 ft. for 5 to 6 days, and (3) severe anemia following blood letting. The receptors were demonstrated by specific stains. Thirty-six to thirty-eight hours after the beginning of hypoxia, the peripheral nerve endings manifested the following structural changes: sharp argyrophilia of the nervous elements, often considerable globular thickening of the fibers, and swelling of the myelin. These reactions to hypoxia manifested themselves most strongly in the receptors with limited branchings belonging to the bulbar conducts. – At prolonged hypoxia, the changes in the nervous tissue increased: the myelin "bulbs" enlarged to the point of breaking their connections, and the fibers dissociated; some receptors decayed (the less ramified first). The bodies of the neurones, however, were not noticeably affected. The most widely spread alterations in the receptors are usually reversible; they resemble the effects of the first phase of dystrophy. These are the changes which are assumed to form the basis of functional disorders.

1690

Labrosse, E. H. 1953

PAPER CHROMATOGRAPHY OF ADRENOCORTICAL STEROIDS. — School of Aviation Medicine, Randolph Field, Tex. Dec. 1953. iii+5 p. (Project no. 21-4001-0002, Report no. 1). AD 26 356 PB 113408

In the search for objective criteria of flying fatigue, methods were developed to study the excretion of individual adrenocortical steroids in the urine. The separation and identification of 50 ug. amounts of adrenocortical steroids have been studied using several paper chromatographic techniques. The simple apparatus employed for these studies is described and illustrated. Using this apparatus and developing with a benzene-methanol-water system, pure steroids, adrenal cortical, and urinary extracts were analyzed. Excellent separation of cortisone and hydrocortisone was obtained, as well as good resolution of the other steroids present. (Author's abstract modified)

1691

Ladell, W. S. S. 1952

FATIGUE AND COLD ON THE KOREA BATTLE FRONT. — In: Ross, S., Report on "Symposium of Fatigue"..., p. 6. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

The Korea winter climate is typically "cold wet"; for a short time each day the temperature is above freezing, but for the rest of the day it may be so cold that thermal equilibrium cannot be maintained by insulation alone and a man must be active if his body temperature is not to fall. The climate itself therefore is stressful. The military situation results in the men living in a state of anticipatory anxiety. Men observed in or immediately behind the front line showed physiological stigmata of chronic stress; 22% of 753 young adults observed had diastolic blood pressures of 99 mm. Hg or over; high systolic pressures and raised resting heart rates were also observed. A small series of eosinophil counts showed a high proportion of raised counts suggestive of some degree of adrenal fatigue; these men were nevertheless capable of showing an eosinopenic response to the acute stress of patrolling. No consistent change was found in the eosinophil count during night guard duty; but both diastolic and systolic blood pressures fell during the night, suggestive of fatigue; and concomitant with a fall in rectal temperature there was a fall in the pulse rate. (From the author's summary)

1692

Lalli, G. 1953

[THE MICROCLIMATE ABOARD MODERN PASSENGER AIRPLANES (PART I)] Il microclima a bordo dei moderni aerei da trasporto. — Rivista di medicina aeronautica (Roma), 16 (4): 502-528. 1953. In Italian. DLC (TL555.A1R5, v. 16)

This is the first part of a review article dealing with the control of humidity, ventilation, air purification, and pressurization in passenger airplanes. Conditions are analyzed and data tabulated and graphically represented concerning oxygen requirements, carbon dioxide excretion, odor intensities (as a function of ventilation), ventilation requirements, perception thresholds of air currents, and cabin pressurization limits. Regulations are quoted from the "Registro Aeronautico Italiano" pertaining to ventilation, pressurization, elimination of toxic vapors, and cabin dimensions on passenger airplanes.

1693

Lambert, E. H., and H. Bjurstedt 1952

EFFECT OF VARIATIONS OF OXYGEN AND CARBON DIOXIDE TENSIONS IN INSPIRED AIR ON LATENCY OF BLACKOUT PRODUCED BY PRESSURE ON THE EYEBALL. — Federation Proceedings, 11 (1I): 87-88. 1952. DLC (QH301.F37, v. 11)

Intra-ocular pressure was increased by pressing on the eyeball through the lower lid with a Balliart tonometer. Pressure above that required to collapse the retinal arteries and cause eventual complete loss of vision was used. The mean latent period between application of the pressure and the onset of dimming of vision for 10 subjects breathing air was 4.7 ± 0.15 seconds. The latent period was increased on the average to 5.4 seconds breathing 60% oxygen and 6.4 seconds breathing 100% oxygen. In one experiment breathing oxygen at 2 atmospheres pressure further prolonged the latent period. Breathing 10% O_2 reduced the latent period only temporarily to 4.3 seconds (P 0.5), but within 3 minutes the latent period was on the average 4.7 seconds even though oxygen saturation of hemoglobin continued to fall. Five percent carbon dioxide in air increased the latent period to 5.2 seconds, while a similar concentration in oxygen increased the latent period to 7.8 seconds. Similarity of blackout produced by eyeball pressure and positive acceleration suggests that breathing oxygen and carbon dioxide may increase g tolerance by increasing the latency of symptoms beyond the time required for pressor reflexes to produce effective compensation. (From the authors' abstract)

1694

Lambertsen, C. J., P. L. Bunce, D. L. Drabkin, and Carl F. Schmidt 1952

RELATIONSHIP OF OXYGEN TENSION TO HEMOGLOBIN OXYGEN SATURATION IN THE ARTERIAL BLOOD OF NORMAL MEN. — Jour. Applied Physiol., 4 (12): 873-885. 1952. DLC (QP1.J72, v. 4)

To determine whether the characteristics of oxyhemoglobin dissociation in blood equilibrated with alveolar air in the lungs are accurately portrayed by existing in vitro curves, and whether major differences exist in the blood of different individuals, the relationships of percentage hemoglobin saturation, pO_2, pCO_2 and pH were determined in 15 normal subjects by analysis of arterial blood collected during the inhalation of gas mixtures ranging from 21 to 4 percent oxygen in nitrogen. Percentage oxygen saturation was measured by both the spectrophotometric and the manometric method in an attempt to evaluate apparent discrepancies between the results obtained by previous investigators using one or the other of these techniques. No differences in the dissociation characteristics of oxyhemoglobin could be detected in the 15 subjects of these experiments. The findings are supported by values for normal, resting arterial percentage oxygen saturation recently reported by other investigators. Percentage oxygen saturation values obtained by the spectrophotometric method were significantly higher and had a smaller random error than those obtained by the manometric method upon blood sampled simultaneously. The previously reported large discrepancy between the spectrophotometric and the manometric techniques has been reduced materially. The remaining disagreement may be related to sources of consistent error in either or both of these methods. The arterial blood of

smokers was found to be significantly lower in both pO_2 and percentage oxygen saturation than that of nonsmokers. (From the authors' summary)

1695

Lambertsen, C. J., 1953
R. H. Kough, D. Y. Cooper, G. L. Emmel, H. H. Loeschcke, and C[arl] F. Schmidt
OXYGEN TOXICITY: EFFECTS IN MAN OF OXYGEN INHALATION AT 1 AND 3.5 ATMOSPHERES UPON BLOOD GAS TRANSPORT, CEREBRAL CIRCULATION AND CEREBRAL METABOLISM. — Jour. Applied Physiol., 5 (9): 471-486. 1953. DLC (QP1.J72, v. 5)

The effects of oxygen inhalation at 1 and 3 - 4 atmospheres ambient pressure upon blood oxygen and carbon dioxide transport, cerebral circulation and cerebral metabolism were studied in normal men. At 3.5 atm., oxygen inhalation produced a 55% increase in cerebral vascular resistance resulting in a 25% reduction in the rate of blood flow through the brain. Due to the slower rate of cerebral circulation, more oxygen was given up to brain tissue than was present in physical solution in the arterial blood. As a result the average internal jugular hemoglobin saturation at 3.5 atm. was 89%. The removal of most of the physically dissolved oxygen produced a fall in pO_2 of about 2000 mm. Hg as blood passed through the brain. Partial interference with the normal reduction of oxyhemoglobin rendered less efficient the transport of carbon dioxide by the blood. No alteration in the rate of oxygen consumption or the respiratory quotient of the brain could be detected at 1 or 3.5 atm. of inspired oxygen. It is proposed that central accumulation of carbon dioxide on oxygen breathing at increased ambient pressures does not contribute to the toxicity of oxygen but rather may indirectly reduce the exposure of brain tissue to toxic levels of oxygen tension by producing hyperventilation and cerebral vasoconstriction. (From the authors' summary)

1696

Lambertsen, C. J., 1953a
M. W. Stroud, R. A. Gould, R. H. Kough, J. H. Ewing, and C[arl] F. Schmidt
OXYGEN TOXICITY: RESPIRATORY RESPONSES OF NORMAL MEN TO INHALATION OF 6 AND 100 PER CENT OXYGEN UNDER 3.5 ATMOSPHERES PRESSURE. — Jour. Applied Physiol., 5 (9): 487-494. 1953. DLC (QP1.J72, v. 5)

The respiratory effects produced by successive inhalation of 6% oxygen in nitrogen, air, and oxygen at 3.5 atmospheres were studied in six normal men. The average results were as follows: Oxygen in the amount of 3.5 atmospheres increased respiratory minute volume about 26 per cent and lowered alveolar pCO_2 6.7 mm. Hg. The increased ventilation was entirely due to a greater tidal volume, and respiratory rate was not elevated. There was a slight rise in carbon dioxide elimination. Administration of 6% oxygen in nitrogen at 3.5 atm. (equivalent to 21% oxygen at sea level) produced no demonstrable effects excepting a 1.3-mm. Hg fall in alveolar pCO_2, indicating that respiratory stimulation by oxygen at increased ambient pressures is due largely to actions of oxygen itself, not to the increased density of the inhaled gas. Air breathing at 3.5 atm. lowered alveolar pCO_2 2.5 mm. Hg but produced no other significant changes. These and earlier observations in men breathing oxygen at 3.5 atm. are discussed in relation to oxygen toxicity, the efficiency of alveolar ventilation at increased ambient pressure and the underlying causes of the respiratory stimulation by high inspired oxygen tensions. The most likely cause of oxygen hyperpnea appears at present to be central accumulation of carbon dioxide resulting from decreased reduction of oxyhemoglobin. (Authors' summary)

1697

Lambertsen, C. J., 1953b
R. H. Kough, D. Y. Cooper, G. L. Emmel, H. H. Loeschcke, and C[arl] F. Schmidt
COMPARISON OF RELATIONSHIP OF RESPIRATORY MINUTE VOLUME TO pCO_2 AND pH OF ARTERIAL AND INTERNAL JUGULAR BLOOD IN NORMAL MAN DURING HYPERVENTILATION PRODUCED BY LOW CONCENTRATION OF CO_2 AT 1 ATMOSPHERE AND BY O_2 AT 3.0 ATMOSPHERES. — Jour. Applied Physiol., 5 (12): 803-813. 1953. DLC (QP1.J72, v. 5)

Simultaneous measurements of respiratory minute volume and the pCO_2 and pH of arterial and internal jugular venous blood were made in 8 normal men during inhalation of 0.0, 2.2, 4.3, and 5.5% CO_2 in 21% O_2 at 1 atmosphere and of 100% O_2 at 3.0 atm. In addition to illustrating the interrelationships during CO_2 inhalation of the factors studied, the results suggest that the 2 to 3mm. Hg elevation of internal jugular pCO_2 or $[H^+]$ produced by breathing O_2 for 15 and 30 minutes at 3.0 atmospheres may in itself be of sufficient magnitude to account for the associated 25% increase in respiratory minute volume. (Authors' summary)

1698

Lambertsen, C. J., 1953c
M. W. Stroud, J. H. Ewing, and C. Mack
OXYGEN TOXICITY. EFFECTS OF OXYGEN BREATHING AT INCREASED AMBIENT PRESSURE UPON pCO_2 OF SUBCUTANEOUS GAS DEPOTS IN MEN, DOGS, RABBITS, AND CATS. — Jour. Applied Physiol., 6 (6): 358-368. 1953. DLC (QP1.J72, v. 6)

Reports of the occurrence of extremely large elevations of the pCO_2 in subcutaneous or peritoneal depots in small animals have been published, pointing to an important role of carbon dioxide retention in oxygen poisoning. Studies in men, dogs, rabbits, and cats indicate that no appreciable elevation of depot pCO_2 can be demonstrated until after the onset of oxygen convulsions and that the subsequent gradual rise in depot pCO_2 is due primarily to pulmonary damage and respiratory failure, not to decreased hemoglobin reduction. The absence of an immediate, gross rise in depot pCO_2

is in agreement with previous findings that diminished hemoglobin reduction during oxygen inhalation at 3.5 atmospheres causes only a 2 to 3 mm. Hg increase in the internal jugular pCO_2 of normal men. The late rise in tissue pCO_2 which follows interference with the pulmonary gas exchange appears to be a result, rather than a cause of oxygen toxicity. (From the authors' summary)

1699

Langen, C. D. 1953
[POLYCYTHEMIA AND PROTOPORPHYRINEMIA DURING HYPOXIA] Polycythaemie en protoporphyrinaemie bij hypoxie. — Aeromedica acta (Soesterberg, Netherlands), 2: 133-140. 1953. In Dutch, with English summary (p. 140). DNLM

The significance of the relation of protoporphyrine content of the red blood cells and the erythropoietic activity of the bone marrow is discussed. Rabbits were exposed to a simulated altitude of 5,800 m. (10.1% of O_2), 6,400 m. (9.1% of O_2), and 7,200 m. (8.1% of O_2). At 5,800 m. the protoporphyrine content of the erythrocytes rose from 12 to 42 units, at 6,400 m. to 64 units, and at 7,200 m. to 84 units in 6 hours. Activation of the bone marrow is assumed to be the cause of the rise in protoporphyrine, which is at its peak below a 10% oxygen pressure. The question is discussed whether other organs and tissues are also stimulated by oxygen want. (Author's abstract, modified)

1700

Langraf-Favre, F. 1953
[FURTHER REMARKS ON EAR PROTECTORS] Remarques complémentaires concernant les protecteurs auriculaires. — Médecine aéronautique (Paris), 8 (1): 61-62. 1953. In French. DLC (TL555. M394, v. 8)

In order to test ear protectors in an objective way, an artificial ear was constructed which had the same acoustic properties (impedance) as the human ear. An ear plug was demonstrated, designated as "K. T. A." [description not given], which afforded good protection at frequencies of 2,000 to 4,000 c.p.s, less protection at higher frequencies; this deficiency was due to the vibration of a metal plate in the ear protector. Another type, the "Selectone", gave better results up to 10,000 c.p.s and thus provided protection even against turbojet noise. Ear plugs reduce temporary deafness after exposure to noise but there is no definitive proof as yet that they prevent permanent cochlear damage as well. — The acoustical protection of the pilot should consist of the pressurized cockpit and a custom-made radio-telephone head set as extra-auricular factors, and the intraauricular protection given by an individually fitted ear plug. The K. T. A. type ear plug was well tolerated by 50% of the subjects tested: some people complained about the inconvenience caused by the position of the ear plug under the telephone head set. The author expresses the hope that a method will be developed whereby subjects with a marked predisposition to cochlear lesions could be eliminated from flight training.

1701

Lansberg, M. P. 1953
MODERN ASPECTS OF THE RECRUITMENT PHENOMENON. — Aeromedica acta (Soesterberg, Netherlands), 2: 79-104. 1953. In English. DNLM

The recruitment phenomenon has proved its clinical value in diagnosis and therapy. Differential diagnoses in cases of perceptive deafness can usually be based on the absence or presence of recruitment. Functional testing, however, becomes difficult in many cases of partial recruitment. The recruitment phenomenon has deepened the insight into the mechanism of sound perception; it serves as a means to reveal the intricacies of temporary or permanent hearing impairments, such as those caused by fatigue, adaptation to noise, or trauma. The middle ear muscles can change the impedance of the sound conduction apparatus, the change differs at various frequencies, or degrees of bone or air conduction and depends on the status of the tympanic cavity.

1702

Lansberg, M. P. 1953a
AEROMEDICAL ASPECTS OF MIDDLE EAR PRESSURE MEASUREMENTS, WITH A CLINICAL NOTE ON AEROTITIS MEDIA. — Aeromedica acta (Soesterberg, Netherlands), 2: 107-118. 1953. In English. DNLM

The pneumophone developed by van Dishoeck is of great practical importance to the flight surgeon; however, a full understanding of its principles is indispensable to avoid false conclusions. A normal middle ear pressure, as determined by van Dishoeck's pneumophone, does not necessarily indicate functional adequacy of the Eustachian tube to flight conditions. Abnormal pneumophone readings, likewise, should be interpreted with great care. In many cases a maximal loudness at negative pressure does not correspond to a quantitatively equal negative middle ear pressure (e.g., in cases of adhesive otitis, flaccid or lax tympanic membrane, or aerotitis with completely filled middle ear). Adhesive otitis is not to be construed as to indicate negative middle ear pressure, and treatment should never be conducted by attacking the tubal opening. Aerotitis media may be caused by (1) mechanical trauma from recurrent acute negative pressure, (2) chemical trauma of the tissues from hypoxia, (3) "ex vacuo" transudate from persisting negative pressure relations, and (4) retention hydrops from inflammatory mucous secretions. No ill effects from the Valsalva-Frenzel procedure of auto-insufflation should be feared in aerotitis media. The Valsalva maneuver is usually the choice method, and should be practiced at home in order to rebuild an efficient air-douching reflex, the lack of which can be correlated with aerotitis media.

1703

Lansberg, M. P. 1953b
SOME NOTATIONS ON AEROMEDICAL HEATING EVALUATION. — Aeromedica acta (Soesterberg,

Netherlands), 2: 245-250. 1953. In English. DNLM

Masking effects on speech are determined mainly by the noise level within the speech range. Technical imperfections, statics in the transmitting system, and faulty pronunciation are some of the complicating factors. Barometric pressure changes and lack of oxygen influence the acoustic performance of both men and apparatus. As yet, no standards of minimum hearing qualifications for aviators have been set up. The author's experiments are aimed at establishing such standards. It is not believed that an auditory impairment suffered long ago (e.g., from parotitis or birth trauma) predisposes to further lesions. The uncertainty in the reliability of the auditory fatigue test (there are great discrepancies between test results) is pointed out. Many cases of definite hearing loss may be due to a single exposure to a sound of great intensity, rather than to the cumulative effect of more moderate exposures. It is possible that the vulnerability threshold of the ear may incidentally or temporarily be lowered by such factors as anoxia or infectious diseases (influenza). In cases where traumatizing factors like noise or barotrauma may endanger the pilot's hearing ability, he should be dissuaded from continuing his job. In an appendix to the article, technical details of speech testing materials, the recording system, and the reproduction apparatus are discussed.

1704

Larsen, P. 1952

OCCUPATIONAL DEAFNESS: CLINIC AND PROPHYLAXIS. — Acta oto-laryngologica (Stockholm), 41 (3-4): 139-157. 1952. In English. DNLM

The degree of hearing loss suffered by men working in noisy environments depends on the following factors: (1) the total duration of exposure; (2) the interval between cessation of work and hearing test, as deafness, in most cases, is partly reversible; (3) pitch, intensity, and duration of noise (high-pitched noise is more injurious than low-pitched noise, and loud noise, interrupted several times a minute, more injurious than continuous noise); (4) accompanying vibrations; and (5) individual susceptibility. --- The primary effect of noise is hearing loss of frequencies above speech range. Insomnia, headache, and nervousness may be the subjective results. Based on both classical function tests and audiograms, three types of hearing loss could be established representing different stages in the development of occupational deafness: (1) cases in which hearing has been found normal by the classical tests, but in which audiometry discloses a slight c^5 dip; (2) cases in which hearing of whispered speech is reduced to less than 1 meter, but the acoustical formula remains otherwise normal (the c^5 dip having become deeper and wider); and (3) cases which may be classified with the classical type of perception deafness, but which audiometrically reveal a more or less suddenly sloping curve, so that the dip has disappeared. Many transition forms are found between these 3 groups. It is not believed that an exact picture of auditory fatigue can be obtained by measuring the effect of fatigue at only one frequency.

1705

Lassiter, L. W., 1952
and H. H. Hubbard.

EXPERIMENTAL STUDIES OF NOISE FROM SUBSONIC JETS IN STILL AIR. — National Advisory Committee for Aeronautics, Washington, D. C. Technical Note no. 2757, Aug. 1952. 35 p.
TIP U66106 PB 107328

Experimental studies, which were conducted on the ground in still air, were made to evaluate some of the effects of parameters such as jet velocity, density, and turbulence level, as well as jet size, on the noise generated by subsonic jets. Most of the tests were conducted with simple model jets so that flow conditions could be closely controlled, and the results are compared with data obtained with a turbo-jet engine. The noise intensity was found to increase considerably with increases in exit velocity and turbulence level and by a lesser amount with increases in jet size and exit gas density, with the highest levels being generally observed downstream of the orifice and near the jet boundary. The jet-noise spectrum was found to be a function of jet size and observer's position; the spectrums having a relatively large low-frequency content are associated with the larger jet sizes and locations close to the jet axis. (Authors' summary)

1706

Lavine, O., 1952
K. H. Langenstrass, C. M. Bowyer, F. E. Fox, V. Griffing, and W. Thaler

EFFECTS OF ULTRASONIC WAVES ON THE REFRACTIVE MEDIA OF THE EYE. — A. M. A. Arch. Ophthalmol., 47 (2): 204-219. 1952.
DNLM (W1. A132, v. 47)

A series of ultrasonic experiments have been performed on excised calves' eyes, with frequencies of 0.5, 1, 2, and 3.25 mc. p.s. of various intensities. Corneal opacity, vitreous liquefaction, and cataractogenic effects have been produced with plane progressive, plane standing, and focused ultrasonic beams. The fine perinuclear cavitation and spotted cortical opacities, as well as the vitreous changes observed by E. Zeiss (Albrecht von Graefes Archiv für Ophthalmologie (Berlin), 139: 301-322. 1938) and I. Kawamoto (Nippon Gankwa Gakukwai Zasshi (Tokyo), 51: 12-16. Feb. 1947) have been found. A new type of experimental cataract and the mechanism for its production are described. (Authors' abstract).

1707

Lawton, A. H. 1953

THERE'LL ALWAYS BE A MAN. — Jour. Aviation Med., 24 (6): 532-535. 1953.
DLC (TL555. A1A4, v. 25)

The human factors in flying are divided into three areas: human engineering, human resources, and aero-medical sciences. The major contribution of human engineering is design of flight controls and instruments so that they are easily and

accurately usable. Human resources research discovers sources of flying personnel and analyzes the jobs that each man might perform in the Air Force. The aero-medical sciences are concerned with the stresses of flying on personnel and with methods of avoiding and minimizing their effects. The following aspects of human factors research are briefly discussed: oxygen equipment, anti-G equipment, in-flight feeding, effects of sound and vibration; improvements in crash helmets and harnesses, ejection seats, parachutes, anti-exposure equipment, and survival gear. Problems concerning the aging pilot are touched upon. The development of evacuation aircraft as a means of rapid transport for the injured and sick is also discribed.

1708

Lawton, A. H. 1953a

AERO MEDICAL SCIENCE'S BEACHHEAD FOR THE HUMAN. — Military Surgeon, 113 (1): 10-12. 1953 DLC (RD1. A7, v. 113)

The organization, functions, and scope of the Human Factors Directorate of the U. S. Air Force, and the developments that led to its origin, are discussed. Human factor research is concerned with such problems as utilization of personnel (selection, classification, assignment, training, and evaluation), and medical care and protection of the flyer. A new field of research added after World War II is that of human engineering, which comprises studies of controls, instrument displays, navigational systems, and gun and bomb sights. Connected with these areas of investigation are evaluations of the causative factors of aircraft and other accidents. Among other problems dealt with by Air Force Human Factors are physical fitness, leadership, morale, rehabilitation, air evacuation, mental hygiene, disease and injury peculiar to flying, and methods of medical training and of indoctrination of medical and flying personnel.

1709

Lay, F. I. 1953

THE FLIGHT NURSE AS A LEADER. — Military Surgeon, 113 (3): 196-200. 1953. DLC (RD1. A7, v. 113)

Moral requirements and qualifications demanded for flight nurses are discussed. The flight nurse must exercise courage, tact, good judgment, and initiative; she must be intelligent and imaginative and have confidence in her vocation; she must be physically strong and energetic. One of the basic principles of nursing is that it includes instruction of patients, of other medical personnel, and of the general public; an ability to teach and to provide counseling service is therefore mandatory. The paper concludes with the formulation of a "Flight Nurse's Creed".

1710

Lazarus, R. S., 1952
and C. W. Eriksen

EFFECTS OF FAILURE STRESS UPON SKILLED PERFORMANCE. — Jour. Exper. Psychol., 43(2): 100-105. 1952. DLC (BF1. J6, v. 43)

An extended version of the Wechsler-Bellevue digit-symbol subtest was administered to a group of college students under simulated stress conditions (threat of failure and pressure in time). As compared to controls, the subject under stress manifested greater interindividual variability in performance. The increase in errors was compensated by an increase in speed. Stress apparently had a more advantageous effect on students of high academic proficiency than on those with low grades.

1711

Lecznar, W. B., 1952a
and P. I. Sperling

COMPARISON OF SCORES ON THE AIRMAN CLASSIFICATION BATTERY (AC-1B) FOR AIRMEN TESTED DAY VERSUS NIGHT AND QUARTERED IN TENTS VERSUS BARRACKS. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-9, March 1952. 5 p. (Project no. 503-001-0014). ATI 175 537
UNCLASSIFIED

From testing records available on examinees processed for the Airman Classification Battery (AC-1B) in December 1950 and January 1951 at Lackland Air Force Base, three samples of recruits were utilized in making two comparisons. These samples were all tested in the same testing rooms by the same examiners, although on different dates. The first comparison was made between two samples, both housed in tents, one of which had been tested during the day while the other had been tested at night. The second comparison was between the tent-housed, day-tested sample and a third sample which had been housed in barracks and tested during the day. In general, it appeared that night testing is not necessarily disadvantageous to examinees if other conditions of testing are approximately equal. Further, the data would tend to the conclusion that the motivation (morale) of recruits housed in tents was at approximately the same level as that of recruits housed in barracks. (p. 2 and 5)

1712

Lee, M. F., 1953
J. P. Henry, and E. R. Ballinger

BASIC REQUIREMENTS FOR SURVIVAL OF MICE IN A SEALED ATMOSPHERE. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report 53-116, May 1953. iii+10 p. (RDO no. 695-72 and 695-77). AD 18 708
UNCLASSIFIED

The survival requirements for mice in a sealed atmosphere were determined preliminary to the design of small suitable mice containers for placement in an orbital rocket. The food, water, oxygen, and soda-lime consumption of a mouse were determined for resting and active stages for periods of 1 hour to 2 weeks. The results suggest that a mouse could live in a small sealed compartment fairly comfortably for a 30-day period. (AD abstract)

1713

Leibowitz, H., 1953
F. A. Mote, and W. R. Thurlow

SIMULTANEOUS CONTRAST AS A FUNCTION OF SEPARATION BETWEEN TEST AND INDUCING FIELDS. — Jour. Exper. Psychol., 46 (6): 453-456. 1953. DLC (BF1.J6, v. 46)

By means of a binocular matching technique the interaction between a foveal test field and an equal-sized inducing field was investigated for various separations between the two fields. For all separations, little or no effect is produced in the test field when the luminance of the inducing field is less than that of the test field. For inducing field luminances greater than the test field, the test field is inhibited in direct proportion to the luminance of the inducing field. The present data are consistent with the assumption that luminance differences in the fovea are exaggerated by an inhibitory mechanism. The ability of inducing fields imaged in the peripheral retina to inhibit activity in the fovea is apparently due to stray light. The relevance of the present data to constancy and other forms of retinal interaction, as well as contrast, is suggested. (Authors' abstract, modified)

1714

Leibowitz, H. W. 1953
VISUAL FACTORS INFLUENCING THE PRECISION OF ADJUSTMENT OF RETICLE PATTERNS: THE INFLUENCE OF LUMINANCE, TEST OBJECT ORIENTATION, AND TEST OBJECT-LUMINANCE RELATIONSHIP ON VERNIER ADJUSTMENTS. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-200, April 1953. iii+13 p. (RDO no. 694-49). AD 18 704
PB 112187

Vernier acuity refers to the ability to detect visually a discontinuity or "break" in a contour, or to line up two straight edges or bars so as to appear continuous. It is specified in terms of a measure of the variability (e.g., the average and standard deviation) of repeated attempts to make coincidence settings. The smaller the variability, the higher the acuity.

The standard deviation for aligning either dark bars on a light background or light bars on a dark background at luminance values of one millilambert or greater is found to be 6 to 11 seconds of arc. This is equivalent to a linear displacement of 0.001 to 0.002 inch at a viewing distance of one yard. As luminance is lowered below one millilambert, variability increases slowly at first and then more rapidly until the test object is no longer visible. At all luminance values, variability is increased about 20% if the components to be aligned are oriented obliquely rather than horizontally or vertically. No improvement of acuity with practice was observed.

1715

Leiman, J. M., 1952
and G. Friedman
VALIDATION OF AIRCREW CLASSIFICATION BATTERY AGAINST ADVANCED FLYING TRAINING—SINGLE ENGINE JET—CRITERION. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-2, Jan. 1952. 3 p. (Project no. 503-001-0012). AD 111 145
UNCLASSIFIED

The purpose of this note is to present the results of a validation study of the Aircrew Classification Battery against advanced flying training-single engine jet. The sample consisted of 894 students who had successfully completed basic flying training and who had either graduated from advanced flying training—single engine jet—or who had been eliminated from such training. Of the 894 cases 140 were eliminated for all reasons. Of the total eliminees 90 were for flying deficiency, 28 for motivational reasons, and 22 for miscellaneous reasons. The validity coefficients are biserial r's with scores on the independent variables being in terms of the standard nine-point scale (with the exception of age and education) and the dependent variable being graduation or elimination from advanced training. The differences between the beta weights for the basic flying training group (R = .62) and the advanced flying training-single engine jet group (R = .44) suggest that the two types of training involve somewhat different abilities. (From the authors' introduction)

1716

Leiman, J. M. 1952a
EFFECT ON THE PREDICTIVE EFFICIENCY OF THE AIRMAN CLASSIFICATION BATTERY WHEN USED IN CONJUNCTION WITH AN AURAL CODE TEST. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-33, Oct. 1952. 6 p. (Project no. 503-002-0001). ATI 188 256
UNCLASSIFIED

This study presents the results of a statistical investigation concerning the advisability of the use of an aural code aptitude test in selecting personnel for the Radio Operator General Course. In order to determine the appropriate criterion to use for validation of the test variables of the Airman Classification Battery (AC-1B) and the Signal Corps Code Aptitude Test (SCCAT), the intercorrelations between the number of hours practice required to pass the several levels of proficiency in receiving code were computed. The multiple correlation of 0.67, calculated for a combination of the AC-1B and SCCAT tests suggests, that prediction can be improved by inclusion of an aural code test in the Radio Operator Aptitude Index.

1717

Lemaire, R. 1952b
[CHANGES IN THE INTRAVENTRICULAR PRESSURE ON THE LEFT DURING HYPOCAPNIC ANOXEMIA] Les variations de la pression intraventriculaire gauche au cours de l'anoxémie hypocapnique. — Comptes rendus de la Société de biologie (Paris), 146 (15-16): 1243-1246. 1952. DLC (QP1.S7, v. 146)

The pressures in the right and in the left ventricle during hypocapnic anoxemia were measured in a chloralized dog by means of a strain gauge or an inductance manometer and timed against the femoral and thoracic arterial pressures. Anoxemia

was induced by inhalation of small quantities of oxygen in nitrogen. Both intraventricular pressures were found to rise after periods of latency, which decreased proportionally to the oxygen percentage in the inhaled air. But the changes in the right ventricle were much greater than those in the left. The reactions started several seconds after anoxemic hyperventilation set in, but preceded the rise of the femoral arterial pressure. As anoxemia progressed, hyperventilation was followed by apnea, and tachycardia by bradycardia, and the intraventricular tensions decreased slowly, but not as low as before experimentation. If anoxemia is interrupted, the intraventricular pressures slowly return to their initial values, the left changing quicker than the right. If anoxemia is continued, the tachycardia which appears at the end is accompanied by a parallel drop in tension on the right and on the left. Therefore, during hypocapnic anoxemia, the left intraventricular pressure varies as well as the right, but the tension changes on the left are much less accentuated. Asynergy in both heart cavities is especially pronounced during severe anoxemia.

1718

Lemley, J. M., and G. R. Meneely 1952a
DISTRIBUTION OF TISSUE FLUID IN HEARTS OF RATS SUBJECTED TO ANOXIA. — Amer. Jour. Physiol., 169 (1): 61-65. 1952.
DLC (QP1.A5, v. 169)

To determine the tissue fluid in the hearts of rats, a method was used in which the radioactive isotope of sodium, Na^{24}, was employed. Assuming that the sodium ion is confined to the extracellular compartments, it was deduced that the sodium space of an organ will represent the extracellular space. After injection of the radioactive sodium, the rats were exposed to increasing degrees of anoxia (air mixtures containing up to 3% oxygen, which proved fatal within 15 minutes). The sodium space was computed by comparing relative radioactive sodium concentrations in a tissue sample with those in a plasma sample. Significant increases were observed in the total water and extracellular water of heart ventricles from rats subjected to anoxia. The intracellular myocardiac water was significantly greater in controls not exposed to anoxia than in experimental animals. However, no such alterations were observed in skeletal muscles.

1719

Lenz, H. 1952
[ON THE SIGNIFICANCE OF THE DEADLY-FRIGHT EXPERIENCE] Zur Bedeutung des Todesangsterlebnisses. — Acta neurovegetativa (Wien), 4 (4-5): 534-542. 1952. In German.
DNLM

Two incidents which took place during the last war and involve episodes of extreme fright are described. One concerned a subject alone in a pocket submarine and under great physical stress (hunger, exhaustion, and anoxia), whose craft was attacked but not hit. He jumped into the water, from where he was rescued after several hours. He developed the following symptoms, which can be directly related to his fright experience: loss of hair pigmentation, rise of body temperature, and prolonged unconsciousness, followed by amnesia, vasomotor disturbances, headaches, and nervous tension. It is believed that the emotional shock had induced cerebral hypoxemia, which, in conjunction with acute hypoglycemia, caused undefined cerebral lesions. --- The second incident concerns a flier who had bailed out from his burning plane at an altitude of 3,000 ft. and landed in a tree, suffering cerebral concussion. Long afterwards, and without any visible provocation, he re-experienced all the physical sensations of the accident. These attacks were followed by unconsciousness and, later, by complete exhaustion. --- The author attempts to interpret these two episodes from both a psychological and physiological angle. In certain cases, usually involving particularly hypersensitive personalities, the distinction between "organic" and "psychogenic" constitutes an oversimplification and should be avoided.

1720

Leonard, A. 1953
EFFECTS OF ADVANCE INFORMATION. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge; abstracted in: Nickerson, J. L. The Ergonomics Research Society Symposium... p. 1-2. Office of Naval Research (London). Technical Report no. ONRL-84-53, June 18, 1953. AD 13 520
UNCLASSIFIED

An experiment is described in which movements of a stylus were directed from a central starting point to one of three positions by the sudden illumination of one of these positions. The movement was completed by return to the starting point. There were two conditions involved: (1) the next signal was given as soon as the illuminated point was reached, and (2) the next signal was not given until the stylus was returned to the starting point. In condition (1) there was therefore an element of advance information. The results were as follows: objectively, the provision of advance information had the effect of reducing the time required to make each response; subjectively, the provision of advance information produced a greater ease of manipulation and a tendency toward a decreased awareness of what one was doing; observationally, the provision of advance information made performance much smoother.
(From J. L. Nickerson's abstract)

1721

Lett, J. E. 1953
NOISE: A PROBLEM IN AIR TRANSPORT AND IN GROUND OPERATION. — Aeronaut. Eng. Rev., 12 (4): 65-68. 1953. DLC (TL501.A326, v. 12)

Jet aircraft noise above 140 decibels exceeds the tolerance level of the human ear. The sound spectrum of jet aircraft noise is of the continuous type, ranging from 100 to 10,000 c.p.s. Sealed cabins of the jet-type transport can act as a shield to high frequency sound, and thus can reduce the total energy transmission into the cabin. The

noise level at an airport, however, is dependent upon the type and number of ground structures, the physical characteristics of the atmosphere, and the distance of the observer from the source of noise. Where ground workers are subjected to continuous-spectrum noises at levels of 90-95 decibels for relatively long periods of time, it is imperative that they be under constant medical surveillance to avoid decreased efficiency, increased irritability, or deafness. To alleviate the noise problem, the following suggestions have been made: (1) personnel should be selected according to their individual susceptibility to noise, (2) adequate protection should be given the ears, and (3) personnel should be given frequent rest periods during the day and should be rotated to other job locales after several months of exposure to noise.

1722

Levi, M., 1953
E. P. Torrance, and G. O. Pletts
SOCIOMETRIC STUDIES OF COMBAT AIR CREWS IN SURVIVAL TRAINING. — Ohio State Univ. Personnel Research Board, Columbus [Contract AF 33(038)10105]; and Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum no. TN-54-5, Nov. 1953. viii+34 p. AD 58 074 UNCLASSIFIED

The major purposes of these studies were: to investigate the relationship of combat crew performance to certain aspects of group structure and to gain a better understanding of the contribution of survival training to changes in group structure. Sociometric questionnaires were administered to the members of 70 B-29 crews scheduled for assignment to the Far Eastern Air Force. Questionnaires were administered before and after survival training. After these crews had flown combat missions over Korea, follow-up data were obtained on 36 of them. (Authors' summary)

1723

Levine, M. 1952
TRANSFER OF TRAINING IN A SYMBOL-SUBSTITUTION TASK AS A FUNCTION OF FIRST TASK LEARNING AND INTERTASK SIMILARITY [Abstract]. — Amer. Psychologist, 7 (7): 284-285. 1952. DLC (BF1.A55, v. 7)

In this study the hypothesis was tested whether the relationships between transfer of training and (a) degree of learning of the first task and (b) intertask similarity are the same for symbol-substitution task as for motor and verbal tasks. Four degrees of learning (2, 4, 8, and 16 minutes of practice) of Task I and three degrees of change of Task II (which always lasted 10 minutes) from Task I were investigated in a factorial experiment using a symbol-substitution task. In this task 16 letters were associated with 16 different nonsense figures in a key which was always available to the subjects; Subject went through a booklet containing only the symbols in randomized sequences, and wrote the correct letter under each symbol. The degree of change variable was effected by changing the symbol-letter associations in the key at the start of Task II. The dependent variable was the number of symbols substituted per 30-second interval during Task II. The results indicate: (a) negative transfer decreases with increasing degrees of learning, with a sharp increase in negative transfer for the 16-minute group; (b) negative transfer increases with increasing degrees of intertask change; (c) negative transfer and the differences between groups dissipate toward the end of Task II.

1724

Levine, M. 1953
TRACKING PERFORMANCE AS A FUNCTION OF EXPONENTIAL DELAY BETWEEN CONTROI AND DISPLAY. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-236, Oct. 1953. v+15 p. (RDO no. 694-44). AD 26 450 UNCLASSIFIED

In two experiments a total of twelve subjects performed a compensatory tracking task with exponential delay inserted between the operator's control and the display. The amount of delay ranged from 0.015 to 2.700 seconds for each subject. A function relating time-on-target to amount of delay was generated. It was found that time-on-target decreases with increasing delays. For delays greater than 0.150 second the decrease is linear with increasing delay; for delays less than 0.150 second the slope is steeper than it is for the rest of the function. These results suggest that decisions about the reduction of exponential delay in operational equipment should be based partly on the range of the delay dimension under consideration. While for most of the dimension the skill will increase linearly with a decrease in the delay, the reduction of very short delays will yield a relatively greater increase in skill. (Author's abstract)

1725

Lewis, D., 1953
J. A. Adams, and W. Spieth
AN ANALYSIS OF PERFORMANCE ON THE IOWA PURSUIT APPARATUS. — State Univ. of Iowa, Iowa City (Contract AF 33(038)-13214); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-5, March 1953. v+30p. (Project no. 509-020-0006). AD 14 721; DLC (UG633.A3772, no. 53-5) PB 110648

An attempt was made to find a short-cut method of measuring individual susceptibility to interference in the performance of motor tasks. A total of 132 airmen at Lackland Air Force Base were given four phases of practice on the Iowa pursuit apparatus, which is a miniature mock-up of the Turret Pursuit Apparatus (cf. Jour. Psychol., 29: 173-182. 1950). The preliminary phase was followed by original learning, interpolated learning, and relearning phases. Stanine scores for eight different aptitude indexes were made available on all but four of the subjects. The correlations were based on the scores of 128 men. The data on the performance of the airmen on the pursuit apparatus confirmed previous findings on interference and

provided additional information on the changes that occur in performance when two basically similar and yet different tasks are learned in succession. (Authors' summary, modified)

1726

Lewis, D., 1953a
D. E. McAllister, and H. P. Bechtoldt
CORRELATIONAL ANALYSIS OF THE LEARNING AND RELEARNING OF FOUR DIFFERENT TASKS ON THE MODIFIED MASHBURN APPARATUS. — Jour. Psychol., 36 (1): 83-109. 1953.
DLC (BF1.J67, v. 36)

A group of 37 male subjects was given extended practice on four different tasks on the Modified Mashburn Apparatus. The tasks included a standard task (Task A) and three others (A-1, A-2, and A-3) obtained by reversing two controls at a time. There was an original learning phase (OL) of 40 trials and a relearning (RL) phase of 20 trials on each task. The measures of performance were number of matches and number of errors per trial. The following results were noted: (1) During each major phase of practice, the means of number of matches increased and the means of total errors decreased in a fairly regular way. (2) Despite losses in proficiency at successive shifts, the overall trend of performance was upward. (3) The correlations between matches scores on representative pairs of trials in the major phases of practice were generally 0.70 or higher. (4) Within each phase of practice there was a decrease in the correlation between performances on pairs of trials as their correlation became increasingly remote. — The factorial analysis yielded five factors one of which was residual. Three of the factors were particularly important: (a) initial adjustment to the task situation; (b) susceptibility to interference; and (c) coordination of responses at high levels of proficiency became the predominant, if not the sole, determiner of level of performance. (From the authors' summary)

1727

Lewis, D., 1953b
D. E. McAllister, and H. P. Bechtoldt
CORRELATIONAL STUDY OF PERFORMANCE DURING SUCCESSIVE PHASES OF PRACTICE ON THE STANDARD AND REVERSED TASKS ON THE SAM COMPLEX COORDINATOR. — Jour. Psychol., 36 (1): 111-126. 1953.
DLC (BF1.J67, v. 36)

A group of 43 male subjects received extended practice on the standard and reversed tasks of the School of Aviation Medicine Complex Coordination Test. There was an original learning phase (OL) or 40 trials on each task followed by three relearning phases on each. The measures of performance were number of matches per trial. The following results were reached: (1) The means of the matches scores increased quite regularly during each major phase of practice. (2) Although large losses in proficiency occurred at the shifts in task, the trend of the performance curves was upward. Initial and final means in one phase of practice were higher than initial and final means in preceding phases. (3) The conditions between matches scores on representative pairs of adjacent trials were generally high. (4) Within each practice phase, the correlations between scores on pairs of trials decreased with the remoteness of the trials correlated. The decrease occurred in the first OL phase prior to the functioning of interference. And (5) the intercorrelations among matches scores on the final trials of the major phases of practice were all 0.73 or higher. — The factorial analysis yielded three factors: (A) initial adjustment to the task situation; (B) coordination of responses at relatively high levels of performance; and (C) susceptibility to interference. During the end of the practice sequence, Factor (C) ceased to play an independent role while Factor (B) became the predominant determiner of level of performance. (From the authors' summary)

1728

Lewis, R. B., 1953
and H. B. Gerstner
BLOOD FLOW AS INDICATED BY TEMPERATURE CHANGES IN RABBIT LEGS BEFORE AND AFTER EXPOSURE TO LOCAL COLD. — School of Aviation Medicine, Randolph Field, Tex. June, 1953. iii+8 p. (Project no. 21-1202-0001, Report no. 3). AD 19 568 UNCLASSIFIED

Observation of temperature changes of the core and deep muscles of rabbit legs before and after exposure of a hind leg to a bath at -12° C. for 30 minutes showed an initial shock reaction with reduction of all temperatures lasting 4 to 5 hours after exposure followed by a period in which the temperatures were quite stable and a few degrees below pre-exposure levels. The greatest decrease in temperature in the post-thaw period occurred in the unexposed legs, but as time passed they warmed faster than the cold-exposed extremities, and within 24 hours the temperatures of both legs were approximately the same and slightly below pre-exposure levels. — In 5 of 8 animals tetraethylammonium chloride in the post-thaw period produced elevation of temperatures in the unexposed leg, but in only one chilled gastrocnemius did the cold-exposed leg respond. — Occlusive tourniquets applied to both legs in the post-thaw period caused all leg temperatures to decrease several degrees. Upon release of the tourniquets the temperatures in both legs began to rise. The temperatures of the cold-exposed and control legs and the responses to a vasodilator and tourniquets indicate that a state of vasoconstriction does not exist in the post-thaw period with the degree of injury used in this investigation. (From the authors' summary and conclusions)

1729

Lifton, R. J. 1953
PSYCHOTHERAPY WITH COMBAT FLIERS. — U. S. Armed Forces Med. Jour., 4 (4): 525-532. 1953 DLC (RC970.U7, v. 4)

Case histories are discussed of flyers experiencing psychiatric difficulties during the Korean campaign. The disturbances can roughly be divided

into the following three categories: (1) anxiety reactions during early missions, (2) effects of undue external stress in the course of the combat tour, and (3) tension related to the final missions prior to preannounced separation from combat duty. The period of initiation to active combat experience is particularly critical; initial fears have to be overcome, and integration of the outsider into the "in-group" often meets with great difficulties. Psychosomatic symptoms are the rule, but relief could normally be attained by suspending the patient from combat flying for a short period. Often, however, the effectiveness of the pilot is permanently impaired. The most satisfactory results can be obtained from early recognition and treatment of the underlying problems before they become incapacitating. This task falls within the province of the unit flight surgeon. Often, cooperation between the flight surgeon and psychiatrist is helpful. Equally important is the role of the flight surgeon in maintaining high standards of squadron morale.

1730

Lightfoot, C., 1953
R. Carhart, and J. H. Gaeth
EFFICIENCY OF IMPAIRED EARS IN NOISE. A. THRESHOLD FOR PURE TONES AND FOR SPEECH. — Sept. 1953. iii+18 p. Northwestern Univ., Evanston, Ill. (Contract AF 33 (038)-22645); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-1203-0001, Report no. 4). AD 22 239 PB 112894

An audiometric study was made of the effects of thermal noise on the monaural air-conduction thresholds of 31 control subjects with normal hearing and of 76 persons with various types and degrees of hearing loss. The following are the main findings of the study: (1) The normal ears, whether responding to speech or to tones, were masked by thermal noise in the manner and to the degree anticipated on the basis of other investigations. (2) When allowance was made for degree of hearing loss, the average impaired ear, regardless of type of loss, performed roughly like the average normal ear. (3) The majority of impaired ears showed less than normal shift in speech threshold at most of the effective noise levels studied. (4) Similar superiority on the part of impaired ears was found for the reception of tones from 1000 c.p.s. downward; however, the reverse was true in the case of tones from 3000 through 6000 c.p.s. . . . (6) The average of the heterogeneous group of hard-of-hearing who were masked by noise of 95-db sound pressure level, had a lower threshold for speech than would be expected for a normal listener masked by the same noise. (From the authors' abstract)

1731

Lightfoot, C., 1953a
R. Carhart, and J. F. Jerger
EFFICIENCY OF IMPAIRED EARS IN NOISE. C. PERCEPTION OF SPEECH AT SUPRA-THRESHOLD LEVELS. — Northwestern Univ., Evanston, Ill. (Contract AF 33(038)-22645); issued by School of Aviation Medicine, Randolph Field, Tex. Dec. 1953. iv+10 p. (Project no. 21-1203-0001, Report no. 6). AD 30 036 PB 113580

Standard speech-discrimination tests were administered to normal and hard-of-hearing subjects at three suprathreshold levels, in quiet and in two levels of thermal noise. The general conclusion was that noise was not observed to exert a systematically detrimental effect on discrimination of monosyllabic words by hard-of-hearing subjects in contrast to individuals with normal hearing. There was, however, substantial variation among individuals. (cf. Lightfoot, C., 1953; and Carhart, R., 1953). (School of Aviation Medicine abstract, modified)

1732

Lincoln, R. S., 1952a
and Karl U. Smith
VISUAL TRACKING. II. EFFECTS OF BRIGHTNESS AND WIDTH OF TARGET. — Jour. Applied Psychol., 36 (6): 417-421. 1952.
DLC (BF1.J55, v. 36)

The present study, comprising three experiments, on 24 subjects, has disclosed certain significant facts about the psychophysical determination of error in direct tracking of a target. It has been found that the pattern relations of target and tracker are related to accuracy of visual tracking. A vernier relation of target and tracker generally produces more accurate performance than an overlapping pattern of target and tracker, when the color of the two elements of the visual presentation is the same. At low illuminations, accuracy drops off decisively for a tracker pattern which overlaps the target. Generally, the effects of change in illumination in relation to variations in the pattern of target and tracker, as well as alterations in the width of the target, are marked by complex interactions which make it difficult to formulate simple rules regarding these relations. Targets some thirty times the width of the controlled tracker are tracked with almost the same accuracy as targets equal to the width of the tracker. In fact, under some conditions, maximum levels of accuracy are found with targets of a width greater than the width of the tracker. These results are secured under conditions in which the criterion of error remains fixed for all target widths. The findings just noted have direct application for the design of the perceptual presentation in tracking devices as well as theoretical implications for understanding tracking behavior. (From the authors' summary)

1733

Lincoln, R. S. 1953
VISUAL TRACKING. III. THE INSTRUMENTAL DIMENSION OF MOTION IN RELATION TO TRACKING ACCURACY. — Jour. Applied Psychol., 37 (6): 489-493. 1953.
DLC (BF1.J55, v. 37)

Each of three groups of 18 subjects received training on either direct, velocity, or aided tracking for a period extending through six successive days. On the seventh day of the experiment 12 subjects from each training group transferred to different types of tracking while the remaining six

subjects in each group continued to track with the control on which they had been trained. Accuracy scores achieved by the subjects were analyzed with regard to the effects of both practice and transfer. The results of the experiment suggest a number of conclusions. The instrumental characteristics of control devices are prime determinants of the accuracy with which those devices may be operated. Practice curves for the three types of tracking show the typical negative acceleration which has previously been demonstrated in studies of direct tracking behavior. For complicated target courses, the accuracy of direct tracking is consistently superior to both aided tracking and velocity tracking. The effects of training are highly specific in nature. The best performance in transfer to any type of tracking is achieved by subjects who are trained on that specific type. Negative transfer effects appear when subjects transfer from aided or velocity tracking to the direct control, while positive transfer effects appear in the reverse situation. (From the author's summary)

1734

Link, M. M. 1953
DEVELOPMENT OF THE ARMED SERVICES BLOOD, BLOOD DERIVATIVES, AND PLASMA EXPANDERS PROGRAM. — U. S. Armed Forces Med. Jour., 4 (8): 1221-1225. 1953.
DLC (RC970.U7, v. 4)

During the past 3 years [1950-1953] the Armed Services Blood, Blood Derivatives, and Expanders Program has fulfilled a two-fold mission. Plasma reserves have been built and whole blood supplied to the Far Eastern Command. Continuous attention has been given to methods of processing fresh plasma, reprocessing World War II stocks, and salvaging material for albumin and globulin. At the same time research projects have been initiated to find a satisfactory plasma extender. In the whole-blood program there were 3 limiting factors, and all were overcome. In sequence of their emergence they were: lack of processing facilities; lack of blood donors; and, finally, lack of blood donor centers. The Blood and Blood Derivatives Program of the Armed Forces has been highly successful. Not only have the requirements for whole blood in Korea been met, but the program to build stocks of plasma reserves for use in time of national emergency has been developed simultaneously with considerable progress in the actual building of reserves. (Author's summary and conclusion)

1735

Lippert, S. 1953
LIMITATIONS TO NOISE AND VIBRATION CONTROL. — In: Haber, H. Proceedings of a Symposium on the Frontiers of Man-Controlled Flight, p. 13-21. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Noise levels are approaching the limits of acoustical comfort and safety. Since each plane interior has unique acoustical and vibrational properties, the problems of soundproofing and of cabin structure modification must be considered separately for each type of craft. Presently, limitations are imposed by economic and space considerations. Graphic representations of acoustical efficiency are given for a number of structural materials. Evaluations of noise levels at various distances from the source are recorded with respect to passenger and ground crew comfort (cf. Lippert, S., 1952). Problems stemming from vibration during flight are outlined, and vibration-absorbing materials are listed.

1736

Liston, D. E., and C. G. Giesecke 1953
EVACUATION BY ARMY AVIATION DURING EXERCISE LONGHORN. — Military Surgeon, 113 (3): 167-171. 1953. DLC (RD1.A7, v. 113)

"Exercise Longhorn" was a two-sided maneuver held in Texas in 1952. Army aviation responsibilities for air evacuation of casualties extended from the front line rearward to division clearing stations and their supporting mobile army surgical hospitals. Attention was focused on air evacuation techniques and operational procedures and control. The only aircraft available were those of the Transportation Helicopter Company assigned to field army. The following were among the findings resulting from the exercise: (1) Army aviation evacuation efforts, for the present, should be directed primarily toward transportation of cases requiring speed and comfort for life-saving purposes; (2) one helicopter ambulance detachment in support of each committed division will ordinarily suffice; (3) the helicopter is an extremely valuable adjunct to surface evacuation, and its capabilities should be exploited at every opportunity, but it does not invalidate the requirements for a field medical service within a field army; (4) patients evacuated by helicopter should be carried inside the cabin; (5) within the field army, helicopter ambulance detachments should be under Division Surgeon control, but operationally, with the Division Medical Battalion; (6) delivery of casualties in rear of the division boundary should be effected by helicopter under unusual circumstances only; and (7) communications and integration of teamwork within commands need improvement.

1737

Lockman, R. F. 1953
THE PREDICTIVE USE OF THE LINEAR DISCRIMINANT FUNCTION IN NAVAL AVIATION CADET SELECTION. — Naval School of Aviation Medicine, Pensacola, Fla. July 2, 1953. 11+4 p. (Project Report no. NM 001 057.16.02).
AD 17 607 UNCLASSIFIED

The detailed computational procedure of the linear discriminant function measure is discussed in relation to the selection of naval aviation cadets. The statistical measure was applied to the test scores of 217 cadets on topographical and spatial orientation, spatial visualization, and mechanical comprehension tests. The criterion was a qualitative one, pass-fail in flight training. A multivariate analysis of the four tests significantly discriminated

between the passing and failing cadet groups. Predictive equations were determined for the passing and failing groups, and for the group into which an applicant should fall. (AD abstract)

1738

Lockman, R. F. 1953a
READABILITY OF NAVCAD SELECTION TESTS. — Naval School of Aviation Medicine, Pensacola, Fla. Sept. 30, 1953. 3+2 p. (Project Report no. NM 001 057.16.15). AD 22 210 UNCLASSIFIED

The psychological tests commonly used in the selection of Naval Aviation Cadets were analyzed by the application of a modified Flesch readability formula (Jour. Appl. Psychol., 32 (3): 221-233. 1948). All but one of the 13 tests, an infrequently used test, appeared to have suitable levels of reading ease for the range of Naval Cadet reading ability. The readability of the test directions, instructions, and items was computed separately. (AD abstract)

1739

Loeschke, G. C. 1953
[DO CHEMORECEPTOR IMPULSES WHICH DEPEND ON THE O_2 PRESSURE PLAY A PART IN THE RESPIRATION AT REST IN MAN?] Spielen für die Ruheatmung des Menschen vom O_2-Druck abhängige Erregungen der Chemoreceptoren eine Rolle? — Pflügers Archiv für die gesamte Physiologie (Berlin), 257 (5): 349-362. 1953. In German. DLC (QP1.A63, v. 257)

Twenty subjects inspired air mixtures containing 32% O_2 in 120 test runs. Inspiration of such mixtures caused a temporary mean decrease of the tidal air volume of 8% during the first minute and a mean increase of 0.44 mm. of alveolar CO_2 pressure. Inversely, switching back to fresh air caused a temporary increase in the tidal air volume. The decrease in ventilation is attributed to the elimination of oxygen insufficiency impulses on the part of the chemoreceptors. A countereffect is exerted by the increased arterial CO_2 tension which is due to an increase in hemoglobin-oxygen saturation and is equivalent to a 4% to 6% increase in the respiratory volume. Thus it may be concluded that, in reality, 12% to 14% of the tidal air volume can be attributed to a chemoreceptor mechanism which depends on the O_2 pressure.

1740

Lombard, C. F. 1953
CREW COMPARTMENT ATMOSPHERE. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 5-7. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Pressure, temperature, humidity, and atmosphere regulation are absolute requirements which must be considered in crew compartment design of modern aircraft.

1741

Lo Monaco [Croce], T. 1953
POSSIBILITY OF OBTAINING AN ANOXIC ANOXIA POLYGLOBULIA BY MEANS OF A CONDITIONED REFLEX. — Jour. Aviation Med., 24 (1): 77-83. 1953. DLC (TL555.A1A4, v. 24)

Rabbits were exposed to barometric pressures of 267-354 mm. Hg in a decompression chamber each day. All exposures to altitude were of the same duration and each minute of the exposure a light was switched on for 15 seconds. Before and after the exposure, an erythrocyte count was made showing the well-known increase of erythrocytes as a result of anoxia. After a period of 14 days, the exact conditions of the experiment were duplicated in the decompression chamber except that there was no decompression, only the light stimulus was repeated. There appeared again an increase in erythrocytes of the same magnitude as when decompression occurred. Paralysis of the functions of the cerebral cortex by anesthesia, however, abolished the erythrocyte reaction to the experiment. Thus, the polyglobulia observed in the latter part of the study was based on a conditioned reflex.

1742

Lo Monaco [Croce], T. 1953a
(FIRST STUDIES ON THE PHYSIOPATHOLOGICAL EFFECTS CAUSED BY THE "SUB-GRAVITATION" IN ANIMALS PROPELLED IN ROCKETS INTO THE UPPER ATMOSPHERE) Primi studi sugli effetti fisiopatologici causati dalla subgravità in animali lanciati, dentro missili, nell' alta atmosfera. — Rivista di medicina aeronautica (Roma), 16 (2): 192-199. 1953. In Italian, with English, French, Spanish, and German summaries (p. 100). DLC (TL555.A1R5, v. 16)

This is a summary of the paper, Henry, J. P., 1952.

1743

Lo Monaco [Croce], T., and A. Scano 1953b
(FUNCTIONAL INVESTIGATION OF RESPIRATORY AND CARDIO-VASCULAR SYSTEM FOR THE SELECTION AND PHYSICAL CONTROL OF THE AIR PERSONNEL) Esplorazione delle funzioni degli apparati respiratorio e cardiovascolare ai fini della selezione e del controllo fisico del personale aeronavigante. — Rivista di medicina aeronautica (Roma), 16 (3): 319-370; discussion, p. 371-379. 1953. In Italian, with English, French, Spanish, and German summaries (p. 365-370). DLC (TL555.A1R5, v. 16)

Physiological effects of airplane flight on the respiratory and cardiovascular systems are discussed. Principles and methods of investigating and measuring pulmonary diffusion, alveolar air, pulmonary ventilation, vital capacity, energy consumption, reserve air, dead space air, apnea, and rate of respiration are critically reviewed. The principal tests employed to explore cardiovascular functions are summarized; these tests may be divided into three main categories: (1) those based on muscular work (e.g., the Schneider Test, the Step Test, etc.); (2) those based on effects of

anoxia (measuring pulse rate and arterial pressure, the Flack Test, etc.); and (3) tests based on the effects of acceleration. The latter category applies particularly to aviation medicine, and use of the human centrifuge or the tilting table are the experimental methods employed. The paper concludes with a listing of tests recommended for the purpose of selecting and checking aviation personnel.

1744

Lo Monaco [Croce], T. 1953c
[PRESENT AND FUTURE TASKS OF AVIATION MEDICINE] Compiti attuali a futuri della medicina aeronautica. — Rivista di medicina aeronautica (Roma), 17(1): 3-14. 1953. In Italian, with English, French, Spanish and German summaries (p. 13-14).
DLC (TL555.A1R5, v. 17)

An attempt is made to present a systematic and coordinated arrangement of the complex subject of aviation medicine. The following principal tasks are outlined: (1) scientific research, falling essentially into two categories, biological and physical, in their special application to aviation; (2) applied studies dedicated primarily to the psychophysiological conditions encountered by man in flight. Under the latter category falls that field of investigation—commonly known as "human engineering"—which explores the mutual adaptation of man and machine. Furthermore, almost all aspects of the psychological and physiological sciences are being studied in their relation to the particular conditions met by man in flight, such as anoxia, acceleration, decompression, etc. Means of counteracting or preventing hazards arising from these conditions are explored. Methods of competent training and psychological conditioning are investigated. Also under this category fall those disciplines which deal with the supervision of the physical and mental health of aviation personnel. Space medicine is now evolving as a new branch of aviation medicine.

1745

Long, W. F. 1952
PREDICTION OF SUCCESS IN THE HIGH SPEED NAVIGATION COURSE. — Human Resources Research Center, Lackland Air Force Base, Tex. Research Note no. AO 52-4, May 1952. 8 p. (Project no. 506-005-0002). TIP U71410 and ATI 159 422 UNCLASSIFIED

This study was made as an empirical check of the Bombardment Observer Comprehensive (BOC) examination as a selection device for a high-speed navigation course. The examination was administered to five classes just before they entered the course. Correlations of 0.63 were found between the BOC examination and a high-speed course examination, 0.50 between the BOC examination and a K-System course examination, and 0.67 between the BOC examination and the combined score from the two course examinations. Since there is the opportunity to select a relatively small proportion from among those eligible to attend the high-speed navigation course, it is recommended that consideration be given to using test results from the Bombardment Observer Comprehensive examination for selection purposes. It is believed that these correlations are nearly as high as could be expected, considering the reliability of all of the examinations. (ATI abstract)

1746

Lotiron, P. C. 1952
[CONTRAINDICATIONS OF TRANSPORTATION BY AIRPLANE] Les contre-indications aux voyages en avion. — (Thesis, Université de Paris) 48 p. Paris: D. P. Taib, 1952. In French. DNLM (W4. P23, 1952, No. 39)

This study proposes to establish the pathological conditions precluding transportation by airplane. The following physiological alterations occurring during high-altitude flights are discussed: hyperventilation, hypoxia, acceleration of the pulse rate, increase in blood circulation and in arterial tension, peripheral vasodilatation, and congestion of the tissues, especially in the lungs. Among the factors disturbing normal physiological functions in flight, positive accelerations (interfering with the free movements of the thoracic wall and diaphragm) and inadequate oxygenation (above 9000 m. even with the oxygen apparatus) are particularly noteworthy. Various diseases are discussed. Flight is contraindicated in cardiovascular diseases (such as severe hypertension and recent myocardial infarct), in pregnancies beyond the eighth month, and in severe anemia which predisposes to anoxemia. Small children are more sensitive to motion sickness, old people more sensitive to hypoxia; otherwise the age factor is irrelevant. The transportation of wounded and of surgical patients has to be supervised by a physician. Drug incompatibility (sensitization to anoxia, decrease in attention) is a matter of particular concern to the pilot.

1747

Loveless, N. E. 1953
MANUAL TRACKING IN THE FOUR QUADRANTS OF A CIRCULAR SCALE. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 835, May 1953. 14 p. AD 16 119
UNCLASSIFIED

Twenty-four subjects were required to control the pointer on a circular scale by means of a control knob placed vertically below it. The task was designed to determine whether the change in the apparent display-control relation for opposite quadrants would affect the accuracy of tracking. Test results indicated that greatest speed and accuracy were obtained with direct drive (when a clockwise rotation of the control knob caused the pointer to rotate in the same direction) rather than reversed drive. Vertical alignment of the pointer (top or bottom target) was recommended over horizontal alignment. For reversed drive the target should be at the bottom of the scale, and for direct drive it should be at the top. (AD abstract)

1748

Lowry, R. H., and F. G. Routledge 1953

DROPPABLE MEDICAL KIT MK III-6 MEN. — Royal Canadian Air Force. Inst. of Aviation Medicine, Toronto. Report no. 52/6, Jan. 1953. 3+10 p., 23 plates (R. C. A. F. Reference no. 15D/177). AD 16 327 UNCLASSIFIED

A medical kit was fabricated to be dropped by parachute to the scene of an accident and to meet the requirements of six men injured in an average airplane crash. The kit is readily broken down into the following 5 units for easy transportation: an 18-lb. collapsible plastic stretcher; a 23-lb. collapsible tubular stretcher; a 22-lb. container with a blood plasma administration set; a 28-lb. container of medical supplies; and a 12-lb. container of accessory equipment. Personnel assisting in rescue operations should have previous training relating to the contents and use of the kit. (AD abstract, modified)

1749

Lowry, R. H. 1953a

TEST TRIALS OF G-4A ANTI-BLACKOUT SUITS IN THE HUMAN ACCELERATOR. — Defence Research Medical Labs. (Canada), Toronto, Ontario. DRML Report no. 157, April 1953. ii+5 p. (DRML Project no. 157-42). AD 12 422 UNCLASSIFIED

Tests in the human centrifuge using 50 jet pilots as subjects indicated that the G-4A Anti-G suit, gave an average improvement in blackout tolerance of 1.9 g. The improvement varied from 0.0 g to 4.0 g, depending on the test subjects. The G-4A Anti-G suit was easy to don, gave freedom of movement, and was comfortable during use in the human centrifuge. In order to obtain the maximum protection from fatigue and blackout, all aircrew must be individually fitted with their respective anti-blackout suits by qualified personnel. (Author's conclusions)

1750

Ludvigh, E., and J. W. Miller 1953

A STUDY OF DYNAMIC VISUAL ACUITY. — Kresge Eye Inst., Detroit, Mich. (Contract Nonr-586(00)); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.01). Joint Project Report no. 1, March 4, 1953. 5+7 p. AD 15 173 UNCLASSIFIED

This investigation shows that, when visual acuity is tested with a moving object, the acuity deteriorates markedly as the angular velocity of the test object relative to the eye is increased. The visual acuity of an individual may be evaluated in terms of two coefficients of which the first is a measure of the static value of visual acuity analogous to that determined by the classical methods. Static acuity is employed chiefly for such special purposes as reading and searching a static visual environment with the head motionless. The second coefficient is a measure of the visual acuity when the eyes are moving. This latter ability may be called dynamic visual acuity; it is employed for most normal functions of the eye. It is shown that individuals with substantially the same static acuity may differ markedly and significantly in their dynamic acuity. Since the test of dynamic acuity elicits large individual differences in normal visual performance which are not revealed by tests of static acuity it may well be of value to ascertain how dynamic acuity varies with age, training, fatigue, anoxemia and other factors which may have relatively slight effects on static acuity. (Authors' summary)

1751

Ludvigh, E. 1953a

THE INFLUENCE OF DYNAMIC VISUAL ACUITY ON THE VISIBILITY OF STATIONARY OBJECTS VIEWED FROM AN AIRCRAFT FLYING AT CONSTANT ALTITUDE, VELOCITY AND DIRECTION. — Kresge Eye Inst., Detroit, Mich. (Contract Nonr-586(00)); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.03). Joint Project Report no. 3, Aug. 17, 1953. 4+2 p. AD 19 387 UNCLASSIFIED

An equation is derived expressing the relationship between (1) the size of critical detail visible from an aircraft, (2) the x and y coordinates of the object on the surface of the earth, (3) the altitude of flight, (4) the orientation of the critical detail relative to the plane of flight, (5) the a and b parameters of the observer's dynamic visual acuity, and (6) the velocity of flight. The concept of ease of seeing, E, is advanced. E is defined as equal to $(\frac{Y}{\beta} - 1)\mathcal{C}$, in which expression Y is the angle available for resolution of detail, β is the angle necessary for resolution of detail, and $\mathcal{C}$ is the Heaviside unit function defined with respect to $\frac{Y}{\beta} - 1$. The concept of efficiency of search is expressed as the integral of E with respect to time. Altitudes, velocities, and patterns of search may be specified so as to make this efficiency maximal; the practical applications are obvious. (Author's summary)

1752

Ludvigh, E. 1953b

PERCEPTION OF CONTOUR. I. INTRODUCTION. Kresge Eye Inst., Detroit, Mich. (Contract Nonr-586(00)); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.04). Joint Project Report no. 4. Aug. 17, 1953. 9+2 p. AD 19 386 UNCLASSIFIED

Experimental evidence is presented which is interpreted as showing that higher derivatives of energy with respect to distance on the retina are the main effective stimulus to contour formation and are the feature of the physical world which chiefly carries visual "intelligence". An extensive field of investigation would appear to be available. (Author's summary)

1753

Ludvigh, E. 1953c

PERCEPTION OF CONTOUR. II. EFFECT OF RATE OF CHANGE OF RETINAL INTENSITY GRADIENT. — Kresge Eye Institute, Detroit, Mich. (Contract Nonr-586(00)); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.05). Joint Project Report no. 5, Aug. 17, 1953. 5+4 p. AD 19 384 UNCLASSIFIED

Effort was directed to ascertaining the nature of the retinal stimulus effective in producing the perception of an edge under certain simple conditions of photopic foveal vision. A method is described by means of which a distal stimulus is computed which, under the conditions of observation existing, will result in the desired proximal or retinal stimulus. The observer can project a small fiducial dot of light onto the distal stimulus to indicate where an edge, break, contour or discontinuity appears. The study indicated that subjective apparent intensity or brightness is not simply related to the intensity on the retina. The amount of energy decrement on the retina had little effect upon the appearance of an edge, and the rate of change of energy with respect to retinal distance was an unimportant factor in the production of edges. The second derivative was considered the lowest derivative of energy with respect to retinal distance of substantial significance for contour information. A fundamental principle is stated to be that a doublet edge may appear substantially symmetrically distributed on either side of a point where the rate of change of the rate of change of intensity on the retina is maximal. The separation of this doublet edge will be smaller the greater the value of the fourth derivative of energy with respect to retinal distance. (From AD abstract)

1754

Luft, U. C., 1953
R. W. Bancroft, and E. T. Carter

RAPID DECOMPRESSION WITH PRESSURE-DEMAND OXYGEN EQUIPMENT. — School of Aviation Medicine, Randolph Field, Tex. April 1953. iii+5 p. (Project no. 21-1201-0008, Report no. 2). AD 11 868 PB 109673

Pressure-demand oxygen equipment was used in 35 rapid decompressions from a simulated cabin altitude of 20,000 to 25,000 feet to a simulated flight altitude of 47,000 to 50,000 feet in 0.3 to 0.5 seconds during normal respiratory activity. During decompression, mask pressures reached an average peak of 61 mm. Hg (range, 38 to 84 mm.). Recordings of mask pressure contours indicated that the escape of gas from the lungs is impeded when wearing a close-fitting mask (A-13) in the first phase of decompression, but that adequate pressure relief is then obtained by leakage around the mask. This was essentially confirmed by an experiment involving decompression to 61,500 feet in which the mask pressure was not significantly greater than in the test culminating at 47,000 and 50,000 feet. No subjective or objective indications of pulmonary damage were observed during or after the experiments. At 50,000 feet, pressure breathing was continued by all subjects for 5 minutes without undue embarrassment. A control test without positive mask pressure led to unconsciousness within 20 seconds. (Authors' summary)

1755

Luft, U. C. 1953a

PHYSIOLOGICAL ASPECTS OF PROLONGED FLIGHT AT HIGH ALTITUDES AND SURVIVAL IN EMERGENCIES. — Aeronaut. Eng. Rev., 12 (4): 56-60, 68. 1953. DLC (TL501. A326, v. 12)

Data regarding physiological tolerances and individual susceptibility to stress at high altitudes must be taken into consideration in aircraft design. For best pilot and crew performance, the following features should be considered: (1) humidity and temperature control of the cabin; (2) cabin pressure maintenance, to overcome the effects of low barometric pressure; (3) supplementary oxygen source or self-sustaining source of oxygen under pressure; and (4) pressurized suits in the event of explosive decompression at high altitudes.

1756

Lundgren, N. P. V., 1953
E. H. Roorbach, and W. M. Boothby

ACCURACY MEASUREMENT OF GASEOUS NITROGEN ELIMINATION USING THE CLOSED CIRCUIT-NITROGEN METER METHOD AT ALTITUDES OF 5,000 AND 14,000 FEET. — Nov. 1953. iii+8 p. Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex. (Contract AF 33(038)-13244); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-1201-0007, Report no. 1). AD 25 670 UNCLASSIFIED

Nitrogen elimination was studied in the same subjects at 5000 feet (at summit of Albuquerque, N. Mex.) and at altitude (14,200 ft. at summit of Mt. Evans. Colo.). Subjects breathed oxygen in the closed circuit recording gasometer system. Residual and tissue nitrogen was collected and then analyzed with a Lilly-Anderson nitrogen meter. The nitrogen elimination of each subject was the same at both altitudes when the volumes were expressed at ambient pressure, body temperature, dry; nitrogen elimination was proportional to the barometric pressure when the volumes were expressed at standard temperature and pressure, dry. The agreement of the results with gas laws indicates that the method could be employed by the AF in evaluating methods for the prevention of decompression sickness in aviators. (AD abstract)

1757

Lundin, G. 1953

[THE AVIATION MEDICAL LABORATORY, LUND] Flygmedicinska laboratoriet i Lund. — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (1): 11-15. 1953. In Swedish. DNLM (W1.SW387, v. 2)

The Physiological Institute in Lund was completed in summer 1952. Occupying the ground

floor and basement are the aeromedical laboratories designed, primarily, for the study of respiration and circulation. Work, so far, has been focused on nitrogen elimination in the human body under simulated stress conditions. Located in the basement, too, are two pressure chambers for the study of the effects of high altitude and explosive decompression on the human body, and for experiments on hazards encountered by the pilot at extreme altitude.

1758

Lundin, G. 1953a
[STUDIES ON DECOMPRESSION SICKNESS: NITROGEN ESCAPE DURING OXYGEN INHALATION] Studier över tryckfallssjuka; kvävgaselimination vid syrgasandning. — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (3): 3-5. 1953. In Swedish.
DNLM (W1.SW387, v. 2)

From research conducted in the Aviation Medical Laboratory, it has been determined that nitrogen elimination from the human body can be divided into three distinct phases. Upon being returned to normal atmospheric pressure rapidly, after exposure to increased pressures in the pressure chamber (or upon being explosively decompressed from atmospheric pressure to a more rarified atmosphere, again in the pressure chamber), the subject might develop bends due to nitrogen bubbles from the interstitial fluid or the blood. The first phase of nitrogen elimination under these conditions takes from 10-15 minutes and is very rapid. The second phase is slower, but elimination is more efficient; this period lasts 12-13 minutes. The last phase is the longest of the three and elimination proceeds slowly. If bends develop, they are more likely to occur during the last phase. Age of the subjects does not seem to be a factor in the development of bends.

1759

Lybrand, W. A. 1952
PERCEPTUAL ORGANIZATION TASKS AS POTENTIAL INDICATORS OF BEHAVIOR DECREMENT. — Univ. of Maryland, College Park. Technical Report no. 3 on Indicators of Behavior Decrement, March 4, 1952. 14 p. (Contract DA-49-007-MD-222). AD 31 303
UNCLASSIFIED

The following criteria are postulated in selecting a task suitable for measurement of fatigue conditions: (1) it should be a perceptual task; (2) it should measure perceptual organization; and (3) it should provide well-defined measurable values. A review of the pertinent literature leads to the recommendation of any one or a combination of the following tests: (1) the horizontal-vertical illusion; (2) Gottschaldt hidden figures (colored); (3) Kohs block designs; (4) Primary Mental Abilities battery (Spacial tests); (5) size constancy; (6) shape constancy; and (7) perception of the vertical with tilted frame of reference. The apparatus for administering these tests is discussed.
43 references.

1760

Lybrand, W. A. 1952a
AN EXPLORATORY INVESTIGATION OF TASKS OF PERCEPTUAL ORGANIZATION AS POTENTIAL INDICATORS OF BEHAVIOR DECREMENT. — Univ. of Maryland, College Park. Technical Report no. 10 on Indicators of Behavior Decrement, July 7, 1952. 26 p. (Contract DA-49-007-MD-222). AD 31 310
UNCLASSIFIED

This study represents an exploratory investigation of the relationship of perceptual organization to bodily conditions assumed to produce general systemic fatigue. More specifically, this experiment was designed to investigate whether or not bodily conditions induced by general activity, sleep deprivation, and the interaction of general activity and sleep deprivation affect performance on the Kohs Block Designs, the Perception of Hidden Figures, and the Muller-Lyer Illusion. Forty-eight male students of the University of Maryland served as subjects for the experiment. The following conclusions were drawn: (1) For use with individuals about whom prior information on basic abilities on the tasks is available, the Kohs Block Designs and Perception of Hidden Figures are accepted tentatively as indicators of behavior decrement in studies with sleep deprivation conditions and with sleep deprivation and general activity interaction conditions employed as independent variables. (2) Behavior involving perceptual organization as a primary dimension is less efficient for individuals deprived of sleep than for individuals not missing regular sleep periods. (3) Behavior involving tasks of perceptual organization with a problem-solving feature, such as the Kohs Block Designs, is more efficient for individuals subjected to mild general activity conditions than for individuals at rest. (Author's conclusions, modified)
24 references.

1761

Lybrand, W. 1953
THE EFFECTS OF PSYCHOLOGICAL STRESS ON REASONING PERFORMANCE. — Univ. of Maryland, College Park. Technical Report no. 18, July 29, 1953. 2+51 p. (Contract DA 49-007-MD-222). AD 31 285
UNCLASSIFIED

An investigation was made of the effects of psychological stress on reasoning test performance. Measures were taken on four reasoning tests, chosen to represent different underlying reasoning abilities, within the framework of a complex factorial design. The independent variables in the study were: (1) administrative pressure; (2) ego-involvement; (3) anxiety; (4) sex; and (5) individual difference. The analysis of variance technique was employed to determine the effects of the independent variables on the reasoning test performance of 48 college students and to obtain a measure of the subjective stress experienced by the subjects during the testing session. Results indicate that certain conditions which may be assumed in general to produce stress on individuals do not necessarily affect their reasoning functions. These stress conditions may act to produce increments in reasoning

performance and problem solving of certain kinds for some persons (males), but a decrement in performance for others (females). Motivation, induced by increasing ego involvement, acts to increase efficiency in certain kinds of problem solving. High ego involvement may induce the feeling of operating under stress and may sensitize the individual to other stressful features in the reasoning tasks. Anxiety may sensitize individuals differently to various stressful conditions of operation in which reasoning behavior is influenced.

1762

Lyman, J. H. 1953
CHARACTERISTICS OF THE HUMAN OPERATOR. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 64-67. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953.
DLC (TL670.C25, 1953)

Psychological and physiological restrictions on the part of the human operator impose limitations on modern aircraft design. Among the factors to be taken into consideration by the equipment designer are perceptual, psychomotor, and neuropsychological limitations. Design features of controls and spatial arrangement should be determined by these factors. Also, adequate selection and training of aviation personnel are prerequisites for achieving optimum performance in space flight.

1763

Maag, C. H., and A. C. Poe 1953
A STUDY OF THE EFFECT OF OMISSION OF RADIO FLIGHT TRAINING DURING STAGE D UPON ADVANCED INSTRUMENT FLIGHT AND ADVANCED RADIO RANGE PROCEDURE PROFICIENCY. — Naval School of Aviation Medicine, Pensacola, Fla. July 4, 1953. 8+6 p. (Project Report no. NM 001 058.23.02). AD 21 028
UNCLASSIFIED

The omission of 5 radio procedure instructional flights from Basic Stage D. did not significantly affect the advanced instrument and radio range flight scores. The advanced flight instructors indicated that the modified syllabus students entered advanced B and F Stage training with somewhat less proficiency than the complete syllabus students, but more ground training and flight briefing brought their proficiency up to standard. (AD abstract)

1764

McAllister, D. E. 1953
THE EFFECTS OF VARIOUS KINDS OF RELEVANT VERBAL PRETRAINING ON SUBSEQUENT MOTOR PERFORMANCE. — Jour. Exper. Psychol., 46 (5): 329-336. 1953.
DLC (BF1.J6, v. 46)

Seven groups of 14 subjects were given one of three kinds of paired-associates pretraining prior to learning to associate each of six colored-light stimuli with one of six horizontal channels and to move a vertical response rod into the appropriate channel (Star Discrimeter). The six channels, which radiate out from a center opening, are located at 60° intervals. Measures of correct responses and errors were obtained on each of 45 20-sec. trials. One group of subjects, during irrelevant pretraining, learned to associate pairs of words which were unrelated to the motor task. During relevant-stimuli pretraining, another group learned to associate words unrelated to the motor task with stimuli which stimulated those used in the motor task. Five separate groups, during relevant-stimuli-relevant-response-words (S-R) pretraining, learned to associate the substitute stimuli with response words based on one of three analogues of the channels on the discrimeter: a "degrees," a "clock," or a "directions" analogue. Relevant-S-R pretraining facilitated subsequent motor performance. The use of either the directions or the clock analogue led to better performance in terms of the correct response measure than did the use of the degrees analogue. (Author's abstract, modified)

1765

McCleary, R. A. 1953
PSYCHOPHYSIOLOGICAL EFFECTS OF COLD. I. THE ROLE OF SKIN-TEMPERATURE AND SENSORY SENSITIVITY IN MANUAL PERFORMANCE DECREMENT. — School of Aviation Medicine, Randolph Field, Tex. Jan 1953. 16 p. (Project no. 21-1202-0004, Report no. 1).
AD 8093 PB 108696

Seventy-two airmen were timed on manual performance tests at 70°, 32°, 0°, -20°, and -40°F. ambient temperature. The decrement in performance increased as a positively accelerated function over the temperature range. The decrement resulting from temperature did not differ from that resulting from arctic clothing until the temperature dropped to 0°F. The rate of decline of digital skin-temperature and sensory sensitivity to cold differentiated 12 subjects significantly with respect to performance ability at low temperatures; the two criteria correlated positively (0.41), but were not identical measures. A relation of complexion differences to cold tolerance was also indicated. No relation was found between performance and the ability to vasodilate peripherally and raise the digital temperature. Negative results were also obtained from correlations between performance and (1) home state, (2) civilian experience, (3) weight, and (4) height. (AD abstract)

1766

McCleary, R. A. 1953a
PALMAR SWEAT AS AN INDEX OF ANXIETY: A FIELD METHOD SUITABLE FOR LARGE GROUPS. — School of Aviation Medicine, Randolph Field Tex. Oct. 1953. iii+10 p. (Project no. 21-1207-0004, Report no. 1). AD 22 240
UNCLASSIFIED

A method for measuring palmar sweat is described that requires a subject to grasp a bag of

crystals whose color shifts with increasing hydration. The color of the crystals, as judged by comparison with a set of standards, yields a measure of the amount of palmar sweat secreted over a fifteen-minute test period. An experiment involving both anxious and nonanxious conditions studied at three ambient temperatures (40°, 70°, and 100° F.) is also reported. Palmar sweat is sensitive in a systematic way to both thermal and psychic influences. The use of this method in a field study involving 248 infantry troops under simulated combat conditions is also described to indicate the general scope of usefulness of the technique. (Author's abstract)

1767

McCleary, R. A. 1953b
A SIMPLE METHOD FOR THE PHYSIOLOGICAL MEASUREMENT OF ANXIETY. — Jour. Aviation Med., 24 (6): 508-513, 535. 1953
DLC (TL555.A1A4, v. 24)

Same as the report, McCleary, R. A., 1953a.

1768

McCord, F. 1953
THE MEASUREMENT OF ADJUSTIVE EYE MOVEMENTS. — Tulane Univ., New Orleans, La. (Contract N7onr-434, Task order 1); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 063.01.31). Joint Project Report no. 31, June 1, 1953. 7 p.
AD 19 411 UNCLASSIFIED

When an individual is tilted laterally to the right or left, adjustive eye movements are made. These are probably effective in producing a partial correction for the oblique optical image produced by body tilting. Many methods have been used by previous investigators in the measurement of this reflex. The present method makes use of visual after-images. It does not require any special optical preparation, and is relatively simple and reliable. Using this method on normal intact adults it was found that for a body-tilt of 45° the mean counter-rolling of the eye was approximately 5°. The results are in line with those of previous investigators. (Author's summary)

1769

McCord, F. 1953a
THE EFFECTS OF AUDITORY-VESTIBULAR NERVE PATHOLOGY ON THE ADJUSTIVE EYE-ROLLING REFLEX. — Tulane Univ., New Orleans, La. (Contract N7onr-434, Task order 1); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 063.01.32). Joint Project Report no. 32, June 1, 1953. 4 p. AD 19 389 UNCLASSIFIED

The method of measuring the counter-rolling reflex by the use of after-images was applied to a patient with acoustic-nerve pathology. Virtual absence of adjustive eye-rolling to lateral body tilts in the right quadrant, and minimal values to tilting in the left quadrant were found for the patient. The results support the contention that normal adjustive eye-rolling is dependent upon the functional integrity of the vestibular system. (Author's summary)

1770

McCormick, E. J. 1952
THE EFFECT OF VARYING INTENSITIES OF ILLUMINATION UPON PERFORMANCE ON A MOTOR TASK. — Jour. Applied Psychol., 36 (3): 193-195. 1952. DLC (BF1.J55, v. 36)

Twenty-seven subjects were tested with the Purdue Hand Precision Test, which consists of inserting a stylus in 3 holes successively uncovered by a rotating shutter at a rate of 126 holes per minute, at three levels of illumination, 5-foot candles, 50-foot candles, and 150-foot candles. Significant differences in performance (one percent confidence level) were found between the 5-foot candle and 50-foot candle levels, and between the 5-foot candle and and 150-foot candle levels; but the difference in performance between 50-foot candles and 150-foot candles was not significant. The study suggests that increasing the level of illumination beyond 50-foot candles will not have any significant effect upon performance on a task of this nature. There is then the implication that, in terms of performance on a task of this nature, the optimum level of illumination is somewhere between 5-foot candles and 50-foot candles. Since intermediate levels between these two points were not investigated, however, the study does not reveal the illumination level (between these limits) which would be optimal. (From the author's summary)

1771

McFarland, R. A. 1952a
PSYCHOPHYSIOLOGICAL PROBLEMS OF AGING IN AIRLINE PILOTS [Abstract]. — Amer. Psychologist, 7 (7): 401. 1952. DLC (BF1.A55, v. 7)

The age range of airline pilots was evaluated within which certain psychophysiological reactions can no longer be compensated for by training, experience, and judgment. Tests were given to approximately 300 pilots between 21 and 60 years of age. In testing ability to hear, measurements were made with a standard audiometer. Vision at low illumination was determined with a Hecht visual discriminometer. Complex reaction times were studied with the Mashburn serial reaction time apparatus. Several additional tests were given relating to vision and intelligence. Ability to carry out duties in flight was judged in terms of flight checks and accidents. The data were then grouped by 5-year intervals and analyzed statistically. The final step was concerned with the analysis of changes in age in relation to design of equipment and medical standards. The findings indicated that there were significant changes in these psychophysiological functions in relation to the age intervals indicated. No relationship was found, however, between age and accidents or between the findings on the tests and failure in flight checks. In

general, it was concluded that the changes in the various functions studied were less than frequently supposed. (From the abstract)

1772

McFarland, R. A. 1953
[FATIGUE IN RELATION TO MOTIVATIONAL FACTORS]. — In: Fatigue and stress symposium, 24-26 January 1952, at Operations Research Office, Chevy Chase, Maryland, p. 66-71; discussion p. 71-72. Johns Hopkins Univ. Operations Research Office, Chevy Chase, Md. Technical Memorandum no. ORO-T-185, Jan. 1953.
AD 4843 UNCLASSIFIED

Personal experience at high altitudes and experiments conducted on pilots undergoing severe stress situations (rapid deceleration, combat missions, etc). have led the author put emphasis on motivational elements in fatigue phenomena. No exact quantitative method has as yet been developed to precisely define these psychological factors.

1773

McFarland, R. A. 1953a
HUMAN FACTORS IN AIR TRANSPORTATION. xv+830 p. New York: McGraw-Hill Book Co., Inc. 1953. DLC (RC1062.M2)

The work is a comprehensive treatise on health and safety in aviation. The conclusions drawn from the study are applicable to civilian and military operations alike. Among others, the following aspects are discussed: selection and training of flight personnel, maintenance of crew health and efficiency, nature and extent of airline operations, sanitation and health in these operations, passenger and service problems, and administrative problems including organization and functions of an air transport medical service. The scope of the book encompasses both biological and medical sciences — experimental psychology, physiology, industrial hygiene, entomology, sanitation, psychiatry, and general medicine. Each of the seventeen chapters is followed by a summary and an extensive bibliography. Data from airline records, charts, and graphs collected from various sources are included.

1774

McGrath, F. P., 1952
C. C. Comstock, and F. W. Oberst
ACUTE AND SUB-ACUTE INHALATION TOXICITY OF HYDRAZINE VAPORS TO RATS. — Federation Proceedings, 11 (1[I]): 374. 1952.
DLC (QH301.F37, v. 11)

The acute inhalation toxicity of hydrazine vapor was studied by exposure of groups of 6 rats for 1/2, 1, 2, and 4 hours to saturated vapors of hydrazine at 25°C. Skin irritation was noted and irregular periods of restlessness alternated with periods of inactivity. Profuse salivation occurred. The most severely affected animals showed marked increase of activity followed by convulsions terminating in death. Delayed deaths up to 14 days occurred among the less severely affected animals of each test. Gross examination of nasal passages revealed acute catarrhal rhinitis. A blood-like material present around the nares was identified as hemoporphyrin. Autopsy disclosed the presence of pulmonary edema in addition to destruction of the bronchiolar mucosa. Subacute studies were made by exposing groups of 20 rats to vapor concentration levels of either 300 mg./m.^{3}, 76 mg./m.^{3}, or 26 mg./m.^{3} for 6 hours per day, 5 days per week, over periods as long as 6 weeks. During the exposure the animals appeared sleepy and were quiet. During the course of the experiment they lost weight. Deaths occurred in each of the 3 groups. The Lt50s were calculated as 27, 50 and, 144 hours of exposures, respectively. Lungs, liver, spleen, and kidneys showed pathologic changes as early as the 3rd day of exposure. (Authors' abstract)

1775

McGrath, R. M. 1952
AN OBJECTIVE METHOD OF CLASSIFYING INDUSTRIAL NOISE ENVIRONMENTS. — A. M. A. Arch. Indus. Hyg. and Occupational Med., 5 (5): 436-444. 1952.
DLC (RC 963.A14, v. 5)

A method is developed which reduces the noise evaluation variables, "intensity and frequency," to one common base line called "the equivalent acoustical impairment level." Correlation data indicate that this method of classifying noise environments does have high predictive value with reference to acoustical impairment. Classification of the noise environments in this study by sones or equal loudness units has not given the accuracy of prediction with reference to acoustical impairment that classification of environments by "equivalent acoustical impairment levels" does. The heterogeneous variables of intensity, frequency, and duration can be reduced to a homogeneous base line, and any published limit of safety which does not do so is not a valid standard. (Author's conclusions, modified)

1776

McGuire, T. F. 1952
EFFECTS OF CERTAIN EMOTIONAL STRAINS AND PARTICULARLY OF SOME OF THE METEOROLOGIC VARIABLES IN A LONG TERM ANALYSIS OF HUMAN BLOOD PRESSURE [Abstract]. — Amer. Jour. Physiol., 171 (3): 747. 1952. DLC (QP1.A5, v. 171)

Five adult males were used in this study. One was a middle-aged hypertensive, another was a young low normotensive and a third was a middle-aged individual whose pressure varied from high normotensive to low hypertensive. The other two were young adult male normotensives beginning the 1st year of medical study. All five were available approximately five times a week, at almost the same time each day, for periods varying from 6 to 14 months. A series of 10 blood pressure readings and 4 pulse readings was taken at each sitting. These five represented widely divergent emotional types. Observations were made upon the effects of emotional disturbances, of such things as impending examinations, of routine-upsetting occasions and the like. Note was also made of variations within the series of readings taken at individual

sittings and their relations to external stimulations The greater body of the study was taken up with a statistical analysis of the blood pressure in light of certain of the meteorologic variables such as barometric pressure, humidity, temperature, the meteorologic changes resultant from storms and the like, in an attempt to correlate these variables with alternations in the day to day levels of blood pressure and pulse. (Complete abstract)

1777

McKerrow, C. B. 1953
A SIMPLE APPARATUS FOR MEASURING THE MAXIMUM BREATHING CAPACITY [Abstract]. — Jour. Physiol. (London), 122 (3): 3P-4P. 1953.
DLC (QP1.J75, v. 122)

In the instrument demonstrated, an attempt has been made to provide a simple apparatus of sufficient accuracy possessing a low resistance to air flow. It can be assembled from readily available components and is constructed so that the part through which the subject breathes can be changed complete after each test to eliminate the risk of transmission of infection. The expired volume is recorded by a standard "400 cu. ft./hr. gas meter". The subject breathes in and out from the 7 l. closed rubber bag contained within a metal tank. As he inspires, air is drawn into the tank through the inspiratory valves in its floor. As he breathes out, the air is displaced from the tank through a three-way tap leading to the expiratory valves and thence to a chamber, the top of which consists of a light rubber bellows. During the fast part of an expiration, some of the air passes into the bellows while the rest goes through the gas meter, so that the discontinuous air flow of expiration is transformed into a continuous flow through the gas meter at a proportionately reduced flow rate. The standard error of a reading (mean of three observations) with the apparatus is under 3.0 l./min. Data on the performance of the apparatus compared with other instruments will be shown. (From the abstract)

1778

Mackworth, N. H. 1952
SOME NUMBER-LEGIBILITY TESTS IN A MOCK-UP CONTROL ROOM. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 785, March 1952. 2 p. TIP U 71616
UNCLASSIFIED

Six WRAF (Women Reserve of the British Air Force) air raid observers ("tellers") were tested with regard to their ability to read block displays (a figure-letter combination) fastened to a plotting table in the center of an experimental control room. The results showed that legibility of the displays varied markedly with the position of observers in relation to the displays. It is concluded that (1) a distance of 25 feet and a viewing angle of 35° give optimum results; (2) observers could work from a centrally located podium, but not from a side position at the same height; and (3) size limitations of the display make it inevitable that observers will work under borderline seeing conditions; reductions of visual acuity by even one line on the standard Snellen eye chart causes considerable increase in errors. Hence, perfect eye sight on the part of the "tellers" is mandatory.

1779

McLaughlin, S. C. 1953
THE EFFECT OF RED LIGHT ON THE ABSOLUTE VISUAL THRESHOLD. — Naval School of Aviation Medicine, Pensacola, Fla. Aug. 3, 1953. 7+1 p. (Project Report no. NM 001 059.28.02).
AD 17 531 PB 116553

Experiments conducted in the past to investigate the photosensitizing effects of exposure to red light as compared to total darkness have met with conflicting results (cf. the papers, McLaughlin, S. C., 1952; Miles, W. R., 1953a; and others). A hypothesis is advanced to explain these contradictions in terms of experimental method. Threshold determination by means of "serial exploration" (stimulation by intermittent test flashes) leads to varying responses depending on whether an ascending- or descending-brightness series is employed. When thresholds were measured by means of a constant-stimulus method the effects of red-light exposure proved to be too insignificant to be of practical value.

1780

McReynolds, J., and I. A. Nichols 1953
COMPARISON OF PERFORMANCE OF NEW AIRMEN ON THE AIRMAN CLASSIFICATION BATTERY AC-1B BY ARMY ENLISTMENT AREA. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-31, Aug. 1953. iv+30 p. (Project no. 503-001-0009).
AD 24 655 PB 118039

The performance of new airmen on the Airman Classification Battery AC-1B was calculated with respect to the 6 Army enlistment areas. Significant regional differences appeared on the ACB variables. The airmen from Area I (New England) performed well as regards the total mean: Area I airmen scored particularly well on verbal and academic tests. Airmen from Area V (West North Central) and from Area VI (Far West) also gave high performance levels; both groups showed strong interest in the mechanical field. Airmen from Area II (South) scored below the total mean on all variables but one. (AD abstract)

1781

Makarov, P. O. 1953
[ADEQUATE OPTICAL CHRONAXIA OF COLOR VISION AND ITS CHANGES DURING NEUROCEREBRAL ACTIVITY IN MAN]. Adekvatnaia opticheskaia khronaksiia tsvetnogo zreniia i ee izmenenie pri nervnomazgovoi deiatel'nosti cheloveka. — Problemy fiziologicheskoi optiki (Moskva & Leningrad), 8: 135-150. 1953. In Russian.
DNLM (W1. PR5815, v. 8)

Adequate chronaxia of foveal cone vision was investigated at microintervals of time, to study the dynamics of the achromatic interval. By means of a specially designed chronaximeter, monocular achromatic and chromatic thresholds were established after dark adaptation for rays of 705, 580, 515 and 465 mμ wave lengths, at a visual angle of 0.3-2°. Tests were made on 8 subjects from 20 to 55 years of age to establish: (1) achromatic thresholds of foveal vision, (2) chromatic threshold of foveal vision at a determined wave length, (3) duration thresholds of chromatic stimulation (adequate chronaxia of color vision), and (4) the achromatic interval. Adequate chronaxia of foveal color vision approaches the values of adequate chronaxia of peripheral vision and depends on the age and the individual characteristics of the subject. In the same subject, it is longer for the red and shorter for the green band of the spectrum. Prior to recognition of the color, the subject perceives the object as colorless, after which the recognition of the stimulant passes in microintervals of time through a range of color degrees until final correct appreciation. Neuro-cerebral activity increases the adequate chronaxia of central color vision.

1782

Malméjac, J., 1952f
and P. Plane

[STUDY OF SUPERIOR NERVOUS DYSFUNCTIONS FOLLOWING VARIOUS STRESSES BY MEANS OF THE CONDITIONED SALIVARY REFLEX IN DOGS: TECHNICAL AND PHYSIOLOGICAL ASPECTS] Etude, a l'aide du reflex conditionnel salivaire chez le chien, de dysfonctionnements nerveux supérieurs consécutifs à des agressions diverses: aspects techniques et physiologiques. — Bulletin de l'Académie nationale de médecine (Paris), 136 (1-2): 24-28. 1952. In French. DNLM

Experiments in dogs, using Pavlov's method of conditioned salivary reflex under increasing degrees of anoxia, produced the following results: (1) In a gaseous mixture of 9.5 to 10% oxygen (6000 m. altitude), a pronounced dissociation between the superior nervous activity and the unconditioned (bulbo-protuberantial) reflexes was observed: the conditioned reflex disappeared rapidly, while the unconditioned (bulbar) reflex persisted. (2) At a 14-15% oxygen concentration (3000 m.), both reflexes increased -- the unconditioned reflex by 50-60%, the conditioned reflex by up to 400%. Stimulation thresholds of the tactile sense of the skin, and taste thresholds for acid, bitter, and sweet decreased. (3) Adaptation phenomena prevailed at oxygen concentrations above 9-10% (below 6000-6500 m.), when one-hour exposures were not exceeded; superior nervous activity reactions were delayed, while threshold deviations diminished; after a few days of rest all adaptation symptoms had disappeared. (4) In severe (10% O_2) anoxia the first phase of superior nervous stimulation was much less pronounced or absent. This method demonstrates clearly the twofold manifestation of superior nervous action, which is first stimulating, then depressing.

1783

Malméjac, J., 1953
S. Cruck, and A. Gross

[DISCUSSION OF THE CHANGES OF GAMMA GLOBULIN AND THE WHITE BLOOD COUNT IN ANOXIA] Discussion sur les modifications des globulines gamma et de la formule blanche sanguines en anoxie. — Comptes rendus de la Société de biologie (Paris), 147 (1-2): 106-108. 1953. In French. DLC (QP1.S7, v. 147)

It was established in a previous study (J. Malméjac, S. Cruck, and G. Neverre, Comptes rendus de la Société de biologie, 142 (7-8): 505-507, 1948) that a spontaneously induced gamma globulin gradient in the blood of a dog diminishes noticeably after the animal has been repeatedly placed at a simulated altitude of 8000 m. It may drop 33% after 15 sessions because of oxygen deficiency. If the altitude exposures are interrupted, the gamma globulin gradient will be progressively restored to its normal value within 2 weeks. The gamma globulin deficit induces lymphopenia because of intervention of the adrenal glands. Repeated intravenous adrenalin injections or exposures to anoxia progressively reduced the reactions of the white blood cells in dogs, and lymphopenia lessened gradually. On the other hand, electrophoretic studies of the plasma have not revealed correlations between increase in the gamma globulin gradient and lymphopenia. The relationship observed between lymphopenia, antibodies, and gamma globulin under the present test conditions appear therefore to be more apparent than real. The mechanisms by which anoxia can exert a "negative" influence on the gamma globulin percentage, should be subjected to closer scrutiny.

1784

Malmström, G., 1953
and T. Sjöstrand

PHYSIOLOGICAL VARIATIONS IN THE ENDOGENOUS FORMATION OF CARBON MONOXIDE. — Acta physiologica scandinavica (Stockholm), 27 (2-3): 231-241. 1953. In English. DNLM

An evaluation was made of the CO volume exhaled per minute by test persons at rest and during physical exercise, or while breathing a gas mixture with varying concentrations of O_2 and CO_2. From determinations of the blood COHb concentration, together with the body's total hemoglobin, variations in the total blood CO were calculated. An estimation of the CO percentage formed in the body was made from the difference between the volume of CO exhaled during a certain period of time and the changes occurring in the total blood CO over the same period. The following results were obtained: (1) Breathing of 100% of O_2 seems to depress the formation of CO. (2) Breathing of 9% of O_2 in nitrogen generally, but not constantly, increases the formation of CO. (3) Breathing of 93.5% of O_2 plus 6.5% of CO_2 may increase the formation of CO. (4) Breathing of 6.8% of CO_2 in normal air increases the formation of CO. (5) Physical exercise leads to increased formation of CO. These observations seem to indicate that

carbon monoxide can be formed in the circulating blood under reduced O_2 tension or under raised CO_2 tension. Thus the endogenous formation of CO should be due, in part, to a breakdown of hemoglobin in the circulating red corpuscles in relation to O_2 and CO_2 transport. (Authors' abstract, modified)

1785

Malone, F. L. 1953
A PRELIMINARY FIELD EVALUATION OF THE RELATIVE DETECTABILITY OF COLORS FOR AIR-SEA RESCUE. — Naval Medical Research Lab., New London, Conn. Report no. 237 (vol. 12, no. 22), Nov. 23, 1953. v+9 p. (Project Report no. NM 002 014.09.01). AD 24 341
PB 113106

This study investigated the relative detectability of a series of Munsell reds (10YR to 10R 6/10, 5/10), fluorescent paints, International Orange, and the standard lifeboat yellow. Observations were made from a P4Y-IP aircraft flying at altitudes of 1000 and 500 feet and at distances of three quarters of a mile to one and three quarters miles from the targets. The targets were spheres of spun aluminum, 34 inches in diameter, which were towed in groups of five by a retriever. Observations were made during the spring and summer on sunny days with a minimum of haze. Colors from 2.5 Red to 7.5 Red were detected first and second a significantly greater percentage of the time than the standard lifeboat yellow. The fluorescents and International Orange also showed greater detectability than lifeboat yellow. (Author's abstract)

1786

Mandigo, R. P. 1953
HEALTH HAZARDS CAUSED BY CONTAMINATION OF BLEED AIR FROM TURBO JET ENGINES. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Memorandum Report no. WCRD 53-102, Aug. 12, 1953. 5 p. (RDO no. 698-31). AD 31 865 UNCLASSIFIED

A discussion is presented of the possible health hazards arising from the contamination of pressurized aircraft compartments with thermal decomposition products of aircraft gas turbine engine oil, and remedial measures are suggested. An investigation was made of the nature and toxicity of the smoke and fumes appearing in the cockpit of the XB and YB-52 aircraft. During tests, the smoke, gas, and fume production was not consistent. The engines under normal operation did not generate more than a trace of smoke. Spraying oil into the air intake of an engine resulted in air contamination in the cabin comparable to that obtained in test flights. Laboratory animals exposed to these materials in the cabin showed evidence of slight toxic reaction. Animal and field tests indicated that the concentration of one of the contaminants, CO, ranged from a safe level to one above the maximum allowable concentration in aircraft cabins (0.005%). Continuous exposure to low but toxic concentrations of CO, as well as short exposure to higher concentrations, could be hazardous. The data and the test pilots' reports showed that the smoke, fumes, and gases constituted a health hazard to exposed personnel and a potential detriment to equipment in the cabin. It is recommended that an investigation be made of each aircraft having turbojet engines which use engine oil Spec MIL-L-7808 to determine the presence of contaminated air in personnel compartments. (AD abstract)

1787

Manhold, J. H. 1953
FURTHER STUDIES OF THE RELATIONSHIP OF PERSONALITY VARIABLES TO DENTAL CARIES. — Naval School of Aviation Medicine, Pensacola, Fla. May 7, 1953. 5 p. (Project Report no. NM 001 057.11.01). AD 17 608 UNCLASSIFIED

An investigation was conducted on the relationship of personality variables to dental caries. Scores for 15 traits were obtained on 266 naval aviation cadets by using the Guilford-Martin and Bernreuter personality inventories. Visual and roentgenographical surveys were made to determine DMF (decayed, missing, filled) ratings. Correlation coefficients at the 5% level of confidence were obtained for three of the traits; a fourth trait was in the same direction. The results appear to substantiate the existence of a relationship between dental caries and certain personality variables. (AD abstract)

1788

Manhold, J. H. 1953a
DENTAL COMPLAINTS OF FLYING PERSONNEL. — Naval School of Aviation Medicine, Pensacola, Fla. Nov. 25, 1953. 3+8 p. (Project Report no. NM 001 057.11.02). AD 27 392
UNCLASSIFIED

The dental complaints of flying personnel recorded at the several clinics in the Basic Training Command, Pensacola, Florida, were analyzed for the period 1 November 1952 to 1 June 1953. During this time, all stages of flight training were in progress. The average complement of flying personnel was 6,557, and they accounted for 3,779 visits to the dental department. Somewhat fewer than one-quarter of the flyers appeared as part of an examination routine; the others had dental complaints. Non-flying personnel averaged 16,800 men and recieved 55,740 treatments. Thus, flying personnel averaged about 1 visit per man per year, whereas the non-flying personnel averaged about 6 visits. The amount of time lost was small; only 14 minutes on the average for each visit in the case of the flyers. Emergency aerodontological conditions were negligible. (Author's summary)

1789

Mann, C. W., and R. O. Boring 1953
THE ROLE OF INSTRUCTION IN EXPERIMENTAL SPACE PERCEPTION. — Jour. Exper. Psychol., 45 (1): 44-48. 1953. DLC (BF1.J6, v. 45)

This experiment was designed to test the effect

of instructions upon the perception of the gravitational vertical. In various positions of lateral inclination, subjects were required to set a target rod to the gravitational vertical against a visual framework. A naive group of subjects was instructed without amplification to set the target to the vertical. A sophisticated group required to set the target rod to the gravitational vertical, was practiced in the performance and frequently reminded during the experimental series to maintain the gravitational vertical as the criterion of judgment. The results indicate that the judgments of the naive group were less precise and more variable than those of the sophisticated group. (Authors' abstract, modified)

1790

Marbarger, J. P., 1953
G. F. Vawter, P. H. Wechsberg, and S. A. Franzblau
ALTITUDE STRESS IN SUBJECTS WITH IMPAIRED CARDIORESPIRATORY FUNCTION. C. STUDIES ON PATIENTS WITH ANEMIA. — Univ. of Illinois. Aeromedical and Physical Environment Lab., Urbana. Jan. 1953. 25 p.; issued by School of Aviation Medicine, Randolph Field, Tex. (Proj. no. 21-23-019, Report no. 3). AD 4388
PB 115801

Observations on the responses of the circulatory system are reported in 14 anemic patients. They were taken to simulated altitudes of 10,000 and 18,000 feet in an air-conditioned low-pressure chamber. Analysis of the records indicate the following: (1) Cardiac output promptly increased with inhalation of ambient air at the reduced barometric pressure existing at 10,000 feet. (2) The increase in cardiac output was occassioned by an increase in pulse rate which tended to stabilize with continued hypoxia and by a marked increase in stroke volume which progressively increased as the period of hypoxia continued. (3) Total effective peripheral resistance to blood flow decreased upon exposure to ambient air inhalation at simulated altitudes up to 18,000 feet. (4) "Useful work of the left ventricle" markedly increased with exposure to 10,000 feet. (5) Oxygen carriage increased 20% above ground level control values at 10,000 feet after 10 minutes and was maintained at this value throughout the test. (6) Mean venous pressure increased progressively as the period of hypoxia continued. (7) The anemic patients withstood the hypoxic exposure very well and within 5 minutes after 100% oxygen was administered, all records had returned to ground level control values. (From the authors' summary and conclusions)

1791

Marbarger, J. P., 1953a
P. H. Wechsberg, G. F. Vawter, and S. A. Franzblau
ALTITUDE STRESS IN SUBJECTS WITH IMPAIRED CARDIORESPIRATORY FUNCTION. B. STUDIES ON PATIENTS WITH ANGINA PECTORIS. — Univ. of Illinois. Aeromedical and Physical Environment Lab. March 1953. 25 p.; issued by School of Aviation Medicine, Randolph Field, Tex. (Proj. no. 21-23-019, Report no. 2). AD 4222
PB 109392

Observations are reported on the responses of the circulatory and respiratory systems of eight adult patients with history and symptoms of angina pectoris but without evidence of acute cardiac disease. They were taken in a low-pressure, air-conditioned chamber to simulated altitudes of 10,000 and 18,000 feet. Analysis of records and patient behavior lead to the following conclusions: (1) Critical levels of safety were approached by exposure of patients to 10,000 feet, and manifestations of distress became acute after 10 minutes at 18,000 feet. (2) Inhalation of 100% oxygen causes return of functional measurements and disposition of patients to ground level control values. (3) Ballistocardiographic records were characterized by low amplitude, absent "H" wave, and notched ascending and descending aspects of "J" wave in some cases. (4) Mean venous pressures increased markedly with the onset of hypoxia. (5) Cardiac output increased to a maximum and then tended to decrease with continued hypoxia. Pulse rate and stroke volume behaved the same. (From the authors' summary and conclusion)

1792

Marbarger, J. P., 1953b
P. H. Wechsberg, C. V. Pestel, G. F. Vawter, and S. A. Franzblau
ALTITUDE STRESS IN SUBJECTS WITH IMPAIRED CARDIORESPIRATORY FUNCTION: A COMPARISON OF THE RESPONSES OF NORMAL SUBJECTS, PATIENTS WITH ANGINA PECTORIS, AND PATIENTS WITH ANEMIA TO HYPOXIA. — Jour. Aviation Med., 24 (4): 263-300, 307. 1953. DLC (TL555.A1A4, v. 24)

Thirty-two subjects (10 normal young adult men, 8 patients with history and symptoms of angina pectoris, and 14 patients with chronic anemia) were exposed to mild and severe hypoxia. Cardiac output promptly increased in all groups of subjects at 10,000 feet and 18,000 feet simulated altitude and promptly returned to ground level values with inhalation of 100 per cent oxygen. Total effective peripheral resistance to blood flow decreased markedly in all groups of subjects at simulated altitudes up to 18,000 feet. "Useful work of the left ventricle" markedly increased in all subjects during exposure to hypoxia. Mean venous pressure remained unchanged in the normal subjects but increased with duration of stress in both angina and anemia patients. Electrocardiographic changes in amplitude occurred with hypoxic stress in normal subjects. This included primarily, depression or inversion of T-wave and depression of S-T segment. Similar changes were observed in the patients. (Authors' summary and conclusions, modified)

1793

Marcotte-Boy, G., 1953
and J. Cheymol

[ION BALANCE AND MUSCULAR PHOSPHORULATION] Equilibre ionique et phosphorulation. — Bulletin de la Société de chimie biologique (Paris), 35 (3-4): 238-243. 1953. In French.
DLC (QD1.S47, v. 35)

Rabbits inhaled a hypoxic gas mixture corresponding to an altitude of 6000 m. Five to ten percent CO_2 were added to compensate for CO_2 loss due to hyperventilation. Ingestion of 20 cc. of 1/4 N HCl solution led to results which supported the hypothesis that the phosphorus metabolism in the muscles under hypoxic conditions is determined by disturbances in the ion balance rather than by changes in oxygen supply: the adenosine triphosphate (A. T. P.)—phosphagene equilibrium was displaced from right to left, causing similar reactions as those observed upon return from moderate hypoxia to normal. The inverse reaction took place when 15 cc. of 1/4 M bicarbonate of sodium solution was administered. Inhalation of pure oxygen paradoxically produced the same changes as those observed under conditions of moderate hypoxemia.

1794

Marcotte-Boy, G., and J. Cheymol 1953a
[DISTRIBUTION OF URINARY NITROGEN IN HYPOXIA] Répartition de l'azote urinaire en hypoxie. — Comptes rendus de la Société de biologie (Paris), 147 (21-22): 1698-1701. 1953. In French. DLC (QP1.S7, v. 147)

Previous findings that protein diets had toxic effects during anoxia and required large amounts of oxygen for the process of deamination have inspired an investigation, whether the mechanism of protein metabolism itself undergoes changes during prolonged severe or less severe hypoxia. Adult rabbits were kept on a carrot diet (poor in N_2) and fed 30 ml. of milk 3 times a day for 3 days. On the 3rd day the animals were exposed to a 7000 or 5000 m. simulated altitude for 7 hours. Urinary samples were collected before, during, and after exposure to hypoxia, and the total nitrogen, urea, aminoacids, and ammonium contents determined. Prolonged and severe hypoxia (at 7000 m.) induced an hourly decrease in glycocoll and in total urinary nitrogen (protein nitrogen and urea nitrogen), but a marked increase in amino- and ammonium nitrogen, an increase in the amount of amino-acids (glutaminic and aspartic acids). Slight hypoxia (at 5000 m.) induced a slight increase in total nitrogen excretion in 10 rabbits indicating a possible slight stimulation of the basic metabolism. At this altitude therefore, the metabolism of the animal is not noticeably disturbed.

1795

Marcus, R. E., L. J. Irvine, G. Stowe, and B. Rubin 1953
EAR PROTECTORS: USE OF MILKWEED FLOSS AS A NEW MATERIAL IN EAR DEFENSE. — A. M. A. Arch. Otolaryngol., 58 (3): 364-366. 1953. DLC (RF1.A7, v. 58)

From the abstract of a paper presented at the Monthly Meeting of the Chicago Laryngological and Otological Society, January 5, 1953: "Insertion of cotton swabbing, milkweed floss covered with batiste, or the manufactured Mine Safety Appliance device reduces auditory thresholds [sic] for pure tones. In each instance the reduction in auditory acuity is more pronounced in the higher frequencies than in the lower. The Mine Safety Appliance device reduces auditory acuity for pure tone to a greater degree in all frequencies than the cotton and the milkweed floss. Statistically, however, the milkweed floss and the Mine Safety device reduce acuity in the two highest frequencies (4098 and 8129 c. p. s.) in the same degree. When used, cotton and milkweed floss were the most predictable in their reduction of auditory acuity for pure tone. The Mine Safety Appliance device gave the most effective suppression in the speech range (500 to 2000 c. p. s.); the milkweed floss, somewhat below; the cotton inserts, considerably below that. The subjects interviewed indicated that the milkweed floss inserts were the least uncomfortable of the three pairs tested."

1796

Marg, E. 1953
THE EFFECT OF STIMULUS SIZE AND RETINAL ILLUMINANCE ON THE HUMAN ELECTRORETINOGRAM. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC AF Technical Report no. 53-203. Dec. 1953. vi+18 p. (RDO No. 696-67). AD 26 849 UNCLASSIFIED

Describes the changes in amplitude of the human electroretinogram (ERG) with varying retinal illuminance and stimulus size. The data are reviewed with particular reference to the effect of stimulus area on the ERG when the total luminous flux is constant. The electrodes were mounted in a contact lens on the eye and in a rubber cup on the forehead. The stimulus apparatus provided a "Maxwellian view" with variable stimulus size from 5° to 41° and luminance up to 2600 millilamberts. As the size of the stimulus is increased, a marked change occurs in the ERG. Curves are presented to illustrate the course of the a-, b-, and b1-waves. The latter is a negative after-b-wave which may be part of the illumination potential of the retina. As the retinal illuminance was varied with different size fields, it was found that the luminous flux appears to be constant for the position of the maximum of the b-wave plot regardless of the size and luminance of the stimulus, within the error of measurement. However, the height of these curves appears to be a function of area, becoming smaller with fields of increasing size. Hence, while stray (nonfocal) light is the primary stimulus in the ERG, an effect of area (focal light) appears to be demonstrated. (From the author's abstract)

1797

Margaria, R. 1953
(FATIGUE AND STRAIN IN AIRMAN) Fatica e strapazzo nell'aviatore. — Rivista di medicina aeronautica (Roma), 16 (1): 5-14. 1953. In Italian, with English, French, Spanish, and German summaries (p. 13-14). DLC (TL555.A1R5, v. 16)

The principal external causes of fatigue in the aviator are: excessive high and low temperatures, anoxia, high winds, immobility, noise, and acceleration. The Selye adaptation syndrome is discussed and its principal phases are outlined: (1) a shock phase (hypothermia, hypotension, hypoglycemia, nervous depression); (2) a countershock phase induced by an increased activity of the adrenal cortex; (3) a resistance phase, marked by a decline in organic functions; and (4) a phase of exhaustion, characterized by the incapacity of the organism to counteract the damaging effects of the stimulating factors. In relating the symptoms of fatigue to the pituitary mechanism and to the functions of the adrenal cortex, Selye has pointed the way to new methods of quantitative evaluation of fatigue as incurred by man in flight.

1798

Margaria, R. 1953a
(THE CONDITION OF SUBGRAVITY AND THE ELIMINATION OF THE EFFECTS DERIVING FROM ACCELERATION) La condizione di subgravità e la sottrazione dall' effetto delle accelerazioni. — Rivista di medicina aeronautica (Roma), 16 (4): 469-474. 1953. In Italian, with English, French, Spanish, and German summaries (p. 473-474). DLC (TL555. A1R4, v. 16)

A method of creating conditions of subgravity by immersion of the test subject in a fluid of equal specific gravity is discussed. Such an experimental procedure would make superfluous the considerably more complicated and costlier methods in which weightlessness is created by means of free falling bodies. Furthermore, a body immersed in a fluid of equal density does not undergo either gravitational or other types of acceleration. This phenomenon could be applied towards prevention of injuries in airplane crashes, by placing the pilot into a reinforced cockpit immersed in a fluid of a density equal to the pilot's body.

1799

*Marshak, M. E. 1952
[ON THE ROLE OF THE CEREBRAL CORTEX IN THE REGULATION OF RESPIRATION IN MAN] O roli kory golovnogo mozga v regulîatsii dykhaniîa u cheloveka. — In: Nervnaîa reguliatsiîa krovoobrashcheniîa i dykhaniîa. Moskva, 1952, p. 52-61. In Russian.

On the basis of his experimental studies, and referring to the pertinent literature, the author comes to the conclusion that the neuro-reflex mechanism, particularly that of the cerebral cortex, plays a leading role in respiratory regulation. This applies especially to different stages of hypoxia and muscular activity. Thus the increase of pulmonary ventilation is a reflex reaction, and the correcting role of the cortex in respiration consists in the establishment of exact correlation between pulmonary ventilation and pulmonary circulation. In untrained subjects these functions are not coordinated, expecially at the start of muscular work leading to hypoxia. This fact was experimentally demonstrated by the author in men by means of oximetry. In individuals trained for a certain type of muscular work conditioned reflex connections between respiration and certain complex motions are formed which prevent the development of hypoxia. Respiratory exercises carried out with this object in mind following verbal instruction can be used to accelerate respiratory adaptation to various forms of activity. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1953 (16): 37-38. DNLM (ZW1. qS729)]

1800

Mases, P. 1953
[RHYTHM AND MODALITIES OF THE PHYSICAL EDUCATION OF THE AVIATOR AND ITS RELATION TO FATIGUE] Rhythme et modalités de l'éducation physique de l'aviateur dans ses rapports avec la fatigue. — Médecine aéronautique (Paris), 8 (4): 339-342. 1953. In French. DLC (TL555.M394, v. 8)

The role of fatigue as experienced by aviators and that of physical exercise as a corrective measure are discussed. In periods of intensive flight, physical exercise is warranted for the following reasons: (1) to stimulate circulatory and respiratory functions in order to bring the oxygen to the level of the tissues; (2) to relax the muscles; and (3) to relax the nervous system. Following a period of complete relaxation and massage, the aviator will participate in light exercise not requiring any mental stress but involving the entire muscular system. This exercise should be stopped immediately at the first sign of fatigue or shortness of breath. — In periods when flight is either completely eliminated or greatly reduced, the physical condition of the aviator has to be improved. This can be achieved by exercises, and sports requiring the use of considerable nervous energy. Fatigue induced by these exercises can be easily detected at the first lapse after a good and steady performance. Also, discoloration of the face (both pallor and reddening), loss of breath, trembling of the limbs, lack of attention, and general weakness, are all indicative of exhaustion. It is recommended that participation of this group of aviators in sports be intensive but of short duration. — Finally, in periods of resting and vacationing, swimming in the sea, mountain climbing or skiing, will all contribute to improve to maintain the beneficial results acquired by the proper physical exercise. At this stage, fatigue due to flying will have been completely eliminated.

1801

Masini, V., 1953
E. Busnengo, and G. Martini
(THE BEHAVIOR OF THE BALLISTOCARDIOGRAM IN ANOXIA) Il comportamento del balistocardiogramma in anossia. — Rivista di medicina aeronautica (Roma), 15 (1): 15-30. 1953. In Italian, with English, French, Spanish, and German summaries (p. 27-28). DLC (TL555.A1R5, v. 16)

Ballistocardiograms were taken of 16 healthy subjects at various stages of anoxia (mixtures containing 10%, 7%, and 5% O_2, respectively). From

the results it is concluded that the anoxic stimulus gives rise to a noteworthy increase in pulse rate proportional to the degree of anoxia and, connected with it, to a constant increase in the cardiac output. The systolic beat remains unaltered in individuals breathing atmospheric mixtures up to 7% O_2, but diminishes considerably when mixtures of 5% O_2 are breathed. An increase in the cardiac index was observed which is obviously due to the increase in cardiac output. It is suggested that the ballistocardiogram be given practical application for diagnostic purposes and to test the degree of cardiac resistance to anoxia.

1802

Matheny, W. G., 1953
A. C. Williams, D. Dougherty, and S. G. Hasler
THE EFFECT OF VARYING CONTROL FORCES IN THE P-1 TRAINER UPON TRANSFER OF TRAINING TO THE T-6 AIRCRAFT. — Univ. of Illinois, Urbana. (Contract AF 33(038)-25726); issued by Human Resources Research Center. Pilot Training Research Lab., Goodfellow Air Force Base, Tex. Technical Report no. 53-31, Sept. 1953. iii+5 p. (Project no. 508-017-0001). AD 22 980 UNCLASSIFIED

To test the hypothesis that the amount of transfer of training is affected by the fidelity with which control pressures are simulated, two groups of subjects were trained to criterion in the P-1 Link trainer and transferred to the T-6 aircraft. One group learned the maneuver of climbing and gliding in the P-1 Link trainer with elevator control stick pressure close to that of the aircraft. The second group learned these maneuvers in the trainer with elevator control stick pressure near zero. A third or control group practiced the maneuvers only in the aircraft. A significant amount of transfer occurred for the glide maneuver only. No significant difference in amount of transfer from trainer to aircraft was demonstrated for the two experimental groups. Examination of the two tasks leads to the hypothesis that transfer of training in this situation depends more upon a correspondence between the sequence or pattern of control forces required in trainer and aircraft than it does upon a correspondence between the absolute amounts of control force required. (Authors' summary)

1803

Matthews, B. H. C. 1953
ADAPTATION TO CENTRIFUGAL ACCELERATION. [Abstract] — Jour. Physiol. (London), 122 (3): 31P. 1953. DLC (QP1.J75, v. 122)

The well-known effects of centrifugal acceleration on man and large animals spring from the disturbance of the circulation resulting from the hydrostatic pressure gradients set up. In addition, the hindrance to muscular movement in man is subjectively striking. In small animals, however, it is to be anticipated that the short hydrostatic columns will not lead to great circulatory disturbance. The effective increase of weight of body and limbs, however, remains. Rats have been reared under continual centrifugal acceleration giving a total of three times that of gravity. They thrive under these conditions and are able to perform normal locomotion; a functional derangement of the whole mechanism of antigravity tonus appears to take place to enable them to do so. The rats remain at below control weight and have lived for over a year and a half under these conditions. A few have been decerebrated and show striking extensor tonus. They also show some abnormal types of movement when placed under normal conditions. Growth in an environment where the normal ratio of mass to weight is altered by a factor of three shows that functional adaptation can occur within the nervous system to meet these conditions; this adaptation is achieved without great macroscopic distortion, but some microscopic changes seen are thought to relate to the changed environment. (Complete abstract)

1804

Maxwell, M. S. 1953
SURVIVAL IN THE TROPICS. — Flying Safety, 9 (6): 2-8. 1953. DLC (UG633.F55, v. 9)

The importance of adequate training and use of common sense for survival in the tropics are exemplified in two accounts from actual experiences.

1805

Maynard, E. G. D. 1953
AERODYNAMIC EFFECTS ON CABIN ALTITUDES. — Jour. Aviation Med., 24 (6): 491-493. 1953. DLC (TL555.A1A4, v. 24)

The author offers evidence to support the theory that it is possible to have a higher cabin altitude reading in pressure cabins with the pressurization inoperable than the ambient altitude. Tests were conducted which prove that the cabin pressure can be less than the pressure of the surrounding atmosphere when the aircraft is flying with its pressurization system shut off. The canopy shape and the location of seal leaks control the cabin pressure.

1806

Mayo, A. M. 1953
ENGINEERING THE COCKPIT FOR THE MAN. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 81-92, chart. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)
Also published as: Designing the Cockpit to the Man. --- Amer. Aviation, 17 (3): 23-26; (4): 48-50. July 6; July 20, 1953.
DLC (TL501.A675, v. 17)

To increase human performance limits under conditions imposed by present-day flight, airplane design must provide the following features: (1) efficient size and arrangement of the cockpit; (2) effective means of presentation of flight data; (3)

comfortable and safety-insuring personal equipment; and (4) a comfortable temperature and pressure environment. Protective mechanisms and devices must be designed so as to allow the body to withstand acceleration, noise, and vibration, and to provide a shield against ionizing radiations and meteorite collisions. Incorporation of a minimum-weight emergency escape system is an additional requirement.

1807

Mazoué, Mme H., 1953
P. Chauchard, and R. G. Busuel
[NERVOUS STIMULATION BY ULTRASONICS OF HIGH FREQUENCY] L'excitation nerveuse par les ultrasons de haute fréquence. — Journal de physiologie (Paris), 45 (1): 179-182. 1953. In French. DLC (QP1.J7, v. 45)

The relationship between ultrasonic nervous stimulation and intensity and duration of ultrasonic vibration stimuli was studied in rats. An ultrasonic generator capable of operating at variable intensities was applied directly to the nerves of the posterior paw of a normal rat submerged in a water bath at 35°C. In regard to the minimal duration of ultrasonic stimulation at various intensities, a law was established which proved to be analogous to the classical law of stimulation capacity as a function of time upon electrical, or sensory stimulations. Below a minimal intensity there was no effect. When the minimum intensity was reached, the threshold remained constant for a relative long time of exposure (10 sec. and over). Above this intensity, the duration of exposure had to be reduced inversely proportionally to the intensity to obtain the threshold. The duration of nervous excitation increases above the threshold, but tends toward a limit peculiar to and increasing with intensity up to a certain maximum. This maximum cannot be surpassed, regardless of intensity and duration of treatment.

1808

Mead, J., 1953
and J. L. Whittenberger
PHYSICAL PROPERTIES OF HUMAN LUNGS MEASURED DURING SPONTANEOUS RESPIRATION. — Jour. Applied Physiol., 5 (12): 779-796. 1953. DLC (QP1.J72, v. 5)

A technique permitting analysis of the physical properties of the lungs simultaneously with respiration in spontaneously breathing human subjects is described in which variation in intraesophageal pressure is utilized as a measure of variation in intrapleural pressure. Lung compliance was found to have a mean value of 0.22/cm. of water over the midrange of lung volume change in 9 healthy young adults. Lung resistance expressed in terms of centimeters of water/liter/second was found to have a mean value of 2 in 7 subjects at a flow of 1 liter/sec. The curvilinear relationship of flow to the resistance component of pressure variation was found to be closely approximated by the expression $\Delta P_R = K_1V + K_2V^2$ up to flow of 2 liters/sec., mean values for K_1 and K_2 being 1.74 and 0.28 in 7 subjects. Lung resistance was found to be inversely related to lung volume over the vital capacity range in 3 normal subjects, the order of magnitude of change being approximately twofold. Lung resistance was found to be approximately the same for the inspiratory and expiratory phases except during rapid respiration where inspiratory resistance continued to fit the parabolic expression as defined during less rapid respiration, while expiratory resistance transiently showed as much as twentyfold increase from these levels. (Authors' summary)

1809

Mech, E. V. 1953
FACTORS INFLUENCING ROUTINE PERFORMANCE UNDER NOISE. I. THE INFLUENCE OF "SET". — Jour. Psychol, 35 (2): 283-298. 1953. DLC (BF1.J67, v. 35)

Four groups of 15 subjects each were required to perform a verbal addition task for 30 minutes a day. Each group worked eight days under two conditions: one a noise condition, the other a quiet condition. Each condition was applied during 15 sixty-second work periods daily. The task consisted of adding the digits 6, 7, 8, and 9 successively to a given two-place number and then repeating this operation for 60 seconds. Each group was given different information regarding the beneficial (or detrimental) effects of noise on performance observed in previous similar experiments. Comparison of the intra-group results revealed the following: (1) Formal instructions or orientation appears to be important in relation to routine production tasks. (2) Once a desired direction is produced, frequent "Set" (the preservation tendency of a response) reinforcements are necessary to maintain superior performance in that direction. (3) Verbal noise per se of a given intensity does not appear to have any necessary effect upon the execution of a routine work task.

1810

Mech, E. V., 1953a
R. W. Schaerer, and D. Auble
THE EFFECTS OF "SET" ON GROUP PERFORMANCE UNDER STRONG AUDITORY STIMULI. — Jour. Psychol., 36 (1): 187-194. 1953. DLC (BR1.J67, v. 36)

The purpose of the experiment was to study the effects of "set" (advance information regarding alleged effects of noise interferences in previous experiments) upon group performance under noise. Three high-school groups of 13 subjects each worked at a routine coding task 20 minutes a day for five days under the following conditions: for 10 minutes of each session the groups worked under noise stimulation of 85 decibels, while for the remaining 10 minutes the groups worked under quiet conditions. Noise and quiet conditions were alternated in a simple ABBA sequence. One group was told only that they were serving in an experiment on the effects of noise. Of the remaining two groups, one was given a "set" to perform better under noise while the other was given a "set" to

perform better under quiet. Analysis of the data indicated: (a) The pre-task "sets" did not produce differential group results in the desired direction. (b) Verbal noise of an accelerated intensity level does not appear to have any necessary effects upon routine performance. (Authors' summary)

1811

Meigs, J. W., and J. P. W. Hughes 1952
ACUTE CARBON MONOXIDE POISONING. — A. M. A. Arch. Indus. Hyg. and Occupational Med., 6 (4): 344-356. 1952.
DLC (RC963.A14, v. 6)

An analysis is presented of findings of 105 patients admitted to the Grace-New Haven Community Hospital between January 1, 1920, and December 31, 1948, with a diagnosis of acute carbon monoxide poisoning. A number of manifestations previously considered unusual were shown to be common in this series, namely, skin lesions, transient respiratory findings, excessive sweating, liver enlargement, localized pain or soreness, and localized edema. Study of differential counts of leucocytes showed that neutrophiles were about three times the normal level, while lymphocytes and eosinophiles were significantly lower than normal in severely poisoned patients. Nine manifestations were almost as common in patients with mild as with severe poisoning, namely, suffused mucous membranes, irregular cardiac rhythm, localized edema, vomiting, headache, pulse rate of 110 per minute or higher, abnormal blood pressure, erythrocyte count of 5,200,000 per cubic millimeter or higher, and glycosuria. It is suggested that the latter group of findings are precipitated by responses of the autonomic nervous system and that the extent of response is a function of the individual more than of the degree of intoxication. In contrast, the signs which correlate with severity may be manifestations of direct hypoxic injury to the oxygen-sensitive cells of the brain as well as stimulation of pituitary-adrenal mechanisms. (From the authors' summary)

1812

Mellette, H. C., and S. M. Horvath 1952
INTERRELATIONSHIPS OF BODY TEMPERATURE CHANGE, RESPIRATION AND METABOLISM IN UNTRAINED HUMAN SUBJECTS DURING EXERCISE [Abstract]. — Amer. Jour. Physiol., 171 (3): 750. 1952.
DLC (QP1.A5, v. 171)

Determinations of rectal and average body temperatures, respiratory minute volume, respiratory rate, oxygen consumption and carbon dioxide production were made in 36 experiments on 12 untrained male subjects walking at a moderate rate for 60 minutes and in 10 experiments on 5 of these same individuals walking at a severe rate for 6 minutes. Predicted changes in alveolar ventilation during moderate exercise determined by appropriate substitutions of steady state rectal temperature and metabolic rate ratio (MRR) data in equations proposed by F. S. Grodins (Physiol. Rev. 30 (2): 220-240. 1950) were considerably greater (60%) than those observed. The present data as well as those published in the literature suggest that the relationship between steady state rectal temperature and metabolic rate has such quantitative variation that its use as a basis for predicting ventilatory changes in work is not feasible. The influence of body temperature changes on respiration in initial stages of work and recovery is masked by coincident changes in more potent, but as yet unidentified, respiratory regulating agents. It is suggested that body temperature changes play a minor role in the regulation of pulmonary ventilation in exercise. (Complete abstract)

1813

Mendelson, E. S. 1953
REDUCTION OF AIRCRAFT ENGINE NOISE HAZARDS. — Jour. Aviation Med., 24 (4): 340-346. 1953. DLC (TL555.A1A4, v. 24)

The physical insult of aircraft engine noise is reaching or is soon likely to reach extensive proportions. The use of ear protective devices must be encouraged. This is primarily the responsibility of medical officers, particularly of flight surgeons, because aviation ground and deck personnel require protection to avoid unnecessary discomfort, pain, deafness, and consequently, rapid turnover. Ear muffs and ear plugs should be evaluated in operations. Muffs are relatively comfortable and provide a sense of protection. Well designed, well fitted, and properly used ear plugs, e.g., NDRC type V-51-R, should be worn since they are more effective than muffs at some frequencies. Dry cotton plugs do not have this advantage. While ceruminosis may occasionally be very effective in this regard, its other characteristic of interfering with ear plug insertion and closure must be emphasized. The flight surgeon must learn from his own experience the precautions required for particular noise environments. Otoscopy and auditory tests will probably become his main evaluational procedures. (Author's conclusion, modified)

1814

Merrill, C. T., R. L. Oakley, D. G. Berger, V. Mazza, and D. J. Allen 1953
PERSONAL EQUIPMENT IN THE FAR EAST AIR FORCES. — Air Research and Development Command, Baltimore, Md. April 1, 1953. 171 p.
AD 40 741 UNCLASSIFIED

This report is based on a study of personal equipment of the Far East Air Force undertaken by the authors from January to March 1953. Data are based on personal information gathered from personnel of FEAF Headquarters and major air bases in Korea, and of representative air bases in Japan. The following items are discussed: (1) flight clothing and restraining devices (Mark IV Constant Wear Anti-Exposure Suit, use of nylon in flight clothing, various types of foot gear, shoulder harnesses and safety belts); (2) survival equipment (life preservers, life rafts, survival kits, escape

and evasion kits); (3) parachutes; (4) oxygen equipment; (5) protective helmets; and (6) anti-gravity suits.

1815

Meyler, L. 1952
INCREASED SENSITIVITY FOR OPIATES AND BARBITURATES IN ANOXIA. — Acta medica scandinavica (Stockholm), 142 (4): 256-258. 1952. In English. DNLM

In states of oxygen insufficiency (bronchial asthma, anemia, bronchitis, pulmonary edema), a great sensitivity to opiates and barbiturates has been observed. In addition, the elevated carbon dioxide content of the blood has a depressant effect on the respiratory center. In case of anoxia, great precaution should be taken in the use of sedatives. The effect of narcotics may be counteracted by administration of pervitin, coramine, and other stimulants.

1816

Middleton, R. H. 1953
EVALUATION OF EXPERIMENTAL MODIFICATION OF A-2 CONNECTOR ASSEMBLY. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note no. WCRD 53-144, Dec. 1953. 31+12 p. (RDO no. 696-72). AD 24 578 UNCLASSIFIED

Because of the hazard due to the accidental disconnection of the oxygen mask quick-disconnect assembly, the oxygen system was modified to impose high inspiratory resistance when the mask hose is disconnected in order to warn the wearer. An evaluation was made of the experimental modification of the A-2 connector assembly to determine the effect of added resistance in limiting inspiratory flow during descent at a simulated free-fall rate. A resistance of 4 to 6 in. of water was adequate to effect a warning that the mask hose is disconnected from the oxygen supply. Greater effort in breathing will be required during bailout with the modified connector assembly, particularly during physical activity. Although negative mask pressures developed during breathing with this equipment were subjectively uncomfortable, they were not of sufficient magnitude to constitute a physiological hazard. (AD abstract)

1817

Middleton, W. E. K., and E. G. Mayo 1952
THE APPEARANCE OF COLORS IN TWILIGHT. — Jour. Optical Soc. Amer., 42 (2): 116-121. 1952. DLC (QC350.O6, v. 42)

Sixty-four colors well-distributed near the Munsell 6-plane were viewed as 2° squares surrounded by a 5° black square which was in turn surrounded by a large area of Munsell N6/. The colors were viewed in random order at luminances of -3.34, -2.86, -2.37, -1.88, -1.38, and -0.88 log. candles/m^2, the illumination being at a color temperature of about 6500°K. The observer was required to signal by means of a switch whether he observed red, orange, yellow, green, blue, purple, or grey. No time limit was imposed. Sixteen sets of observations were made by each of two observers, eight sets by a third observer. All had normal color vision. At the lowest luminance only, occasional observations of purple were reported, nearly all colors appearing grey. As the luminance was raised, purple appeared first, then blue. The colors along an axis from about 7.5GY to 2.5P required the greatest illumination to appear chromatic. These results show an interesting correspondence with those of Middleton and Holmes (Jour. Optical Soc. Amer., 39: 582. 1949) on the appearance of colors subtending small angles. (Authors' abstract)

1818

Mies, H. 1952
[ON THE EFFECTS OF VESTIBULAR STIMULATION ON THE CHRONAXIA OF THE SINGLE MOTOR NERVE FIBER] Über den Einfluss der Vestibularisreizung auf die Chronaxie der einzelnen motorischen Nervenfaser. — Pflügers Archiv für die gesamte Physiologie (Berlin), 255 (6): 519-529. 1952. In German. DLC (QP1.A63, v. 255)

Ischiatic nerve fibers of unanesthetized and anesthetized (Urethan) frogs were isolated and subjected to electric stimulation. Vestibular stimulation was applied (1) electrically (galvanic currents) and (2) calorically (low temperatures). Chronaxia measurements were taken regularly every minute. Caloric and galvanic stimulations were found to be equally effective. Chronaxia changes were registered immediately after stimulation and persisted throughout its duration. Labyrinthectomized animals did not show any reactions to caloric stimulation on the operated side. Light stimulation of the dark-adapted eye, likewise, caused chronaxia changes in the motor nerve fiber, which were, however, less pronounced and receded during the stimulation. The initial chronaxia value determined its direction; at low values chronaxia was extended, at high values shortened; the "critical" value was at 0.4 msec. Anesthesia caused an increase of the initial value. Thickness of the nerve fiber also influenced the initial chronaxia value. The underlying physiological mechanisms are discussed.

1819

*Mikhlin, E. G. 1953
[ON THE INFLUENCE OF THE CEREBRAL CORTEX ON THE VESTIBULAR APPARATUS] K voprosu o vliianii kory bol'shikh polusharii golovnogo mozga na vestibuliarnyĭ apparat. — Sbornik nauchnykh trudov Krasnoiarskogo Meditsinskogo Instituta (Krasnoiarsk), 3: 252-253. 1953. In Russian.

Clinical observations have shown the inconstancy of duration of postrotatory nystagmus and other somatic reactions in the same patient during repeated application of the same stimulus. These fluctuations average 15-45 seconds for the right

and 12-40 seconds for the left labyrinth. Formerly, the variations in duration and intensity of vestibulo-somatic reactions were believed to depend on the duration and intensity of the endolymph flow in the semicircular canals. Inconstant nystagmus in one subject was believed to be due to a difference in endolymph viscosity and in the diameters of the semicircular canals; the vestibular apparatus was considered to be a mechanical device, whose function is proportional to the intensity of stimulation. These explanations are not satisfactory. Only in the light of I. P. Pavlov's teaching can this phenomenon be correctly understood. The works of Soviet authors have shown that regulation of the duration and intensity of nystagmus is an inherent function of the cerebral cortex. [Abstract in: Sovetskoe meditsinskoe referativnoe obozerenie, Nevropatologiia (Moskva) 1954 (11): 12. DNLM (ZW1. qS729)]

1820

Milch, L. J., 1953
R. F. Redmond, and W. W. Calhoun
EVALUATION OF CLINICAL TESTS FOR ATHEROSCLEROSIS: INTERACTION OF HEPARIN AND ADENOSINE-5-MONOPHOSPHATE IN HYPERLIPOPROTEINEMIC RABBITS. — School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii+11 p. (Project no. 21-1601-0007, Report no. 4). AD 19 655 PB 112223

Adenosine-5-monophosphate (AMP), heparin, and the two drugs together were administered to normal rabbits and, also, to rabbits that had been rendered hyperlipoproteinemic (HLP) by local cold injury. In the normal animals, AMP alone and heparin alone were both effective in reducing the plasma concentrations of all lipid components measured and, also, the levels of the S_f 12-20 [i.e. with a flotation rate between 12 and 20 Svedberg units, see Science, 111 (2877): 166-171. Feb. 17, 1950] and S_f 20-100 classes of plasma lipoproteins. Dual treatment with both drugs in normal animals seems to be slightly more lipotropic with respect to the S_f 12-20 and S_f 20-100 classes of plasma lipoproteins than either AMP or heparin alone. Dual treatment with both drugs in HLP rabbits seemed to be no more effective than heparin administration alone. Neither of the drugs, nor the combination, was found to alter the plasma cholesterol concentrations in HLP rabbits. (From the authors' summary)

1821

Miles, P. W. 1953
ANOMALOUS BINOCULAR DEPTH PERCEPTION DUE TO UNEQUAL IMAGE BRIGHTNESS. — A. M. A. Arch. Ophthalmol., 50 (4): 475-478. 1953. DLC (RE1.A62, v. 50)

A new anomaly of binocular depth perception due to unequal image brightness is described and named "anisodominance". It is of general functional significance, because when other distance clues are equal, a right-eyed person will see the right one of two objects nearer and a left-eyed person will see the left one of the same two objects nearer. In this day of rapid air, land, and sea traffic, this anomaly merits further study. (Author's summary and conclusions)

1822

Miles, W. R. 1952
AGING IN AIR FORCE PILOTS AS STUDIED BY THE AMERICAN INSTITUTE FOR RESEARCH [Abstract]. — Amer. Psychologist, 7 (7): 401. 1952. DLC (BF1.A55, v. 7)

The effects of aging in relation to on-the-job performance and related attitudes were studied in 850 aircrewmen. A group interview technique was used, in which written responses were obtained. Subjects were requested to cite incidents in which effects of aging had a critical effect, either leading to notably poorer or better performance. Results indicate that impairment due to age occurs in the following five major areas: (1) Physical abilities necessary for effective performance are affected, in particular the ability to resist fatigue and excessive demands upon the organism. (2) Ability and motivation to improve in skill and technique tend to decline with age. (3) Actual job performance deteriorates particularly with respect to speed and accuracy of work and corrective action, retention of control in emergency situations, and retention of a proportionate degree of caution. (4) There is some indication that relationships with co-workers tend to become poorer. (5) Finally, motivation and adjustment with respect to the job are in general negatively affected by age.

1823

Miles, W. R. 1953
IMMEDIATE PSYCHOLOGICAL EFFECTS [OF NOISE]. — In: Benox report: an exploratory study of the biological effects of noise, p. 81-95. Univ. of Chicago, Ill., Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

Impressions gained from observing personnel and interviewing a few men on the U.S.S. Wasp now operating jet planes not equipped with afterburners include the following: A condition of very high morale exists, favorable to efficient teamwork in many if not all phases of jet-engine operations. The majority of young men become acclimated to intense noise when it seems a necessary evil. The majority of personnel working with jets do not wear ear defenders. The teamwork seen for the launching and recovery of jet planes appeared well organized and efficient. No obvious slowness or clumsy movements were noted. Personnel appeared to be well relaxed and emotionally flexible between stints of intense work. The sociability index seemed high. The hand signals might well be made more prominent and less brief. The flag signals, white and red, from the view of the plane starter are deflected by wind and poorly visible. These signals might be made stiff semaphore type or changed to lights for both day and night use. Instruction, demonstration, and training in reference to jet noise hazards and ear protection would appear desirable from several points of view. The impression was received that the check-out of new

crewmen in reference to their jobs is inadequate. More care should be taken to acquaint the men in advance with all aspects of the job they are to undertake and, particularly, to emphasize the special difficulties which result from the high noise environment. Special instruction should be given as to the best method of dealing with these difficulties. (From the authors' summary)

1824

Miles, W. R., and B. M. Shriver 1953a
AGING IN AIR FORCE PILOTS. — Jour. Gerontology, 8 (2): 185-190. 1953. DNLM

A "critical-incident" technique of interviewing (developed by the American Institute for Research under a contract with the Department of Experimental Psychology, School of Aviation Medicine, U.S. Air Force) was designed to predict: (1) retention of physical fitness for the job; (2) the ability of learning and practicing skills of specialty; (3) expected changes in flight performance; (4) relations with co-workers; and (5) morale and adjustment to the job. Using this interview method, 851 aircrew men in the United States were requested to cite incidents in their careers in which the influence of aging was believed to have had a critical effect leading to either better or poorer performance. Evaluations of 1836 critical behavior incidents of aircrew men station in Hawaii, Korea, and Japan were also used in the study. The average age of the crew men interviewed was 29.5 years. The average age of crew men reported upon was 31.2 years. Of the latter, 68% were pilots, and 32% were navigators, bombardiers, and others. It was concluded that the results of this survey might be used as a check list by those concerned with observing and evaluating fitness of military aircrew men in the service.

1825

Miles, W. R. 1953b
EFFECTIVENESS OF RED LIGHT ON DARK ADAPTATION. — Jour. Optical Soc. Amer., 43 (6): 435-441. 1953. DLC (QC350.06, v. 43)

Reference is made to a previous paper (McLaughlin, S. C., 1952), in which it was shown that visual dark adaptation proceeds more rapidly in red light than in total darkness. To re-examine these findings, 16 subjects were monocularly dark adapted with the aid of goggles so constructed as to allow for insertion of a blue glass disk in one, and a red glass disk or an opaque disk in the other frame. Thresholds were determined with the Hecht-Schlaer adaptometer no. 8. After an adaptation time of 25 minutes under an illumination of 8 millilambert, thresholds were established at 2- and 6-minute intervals for each eye. Increased light sensitivity (lower threshold values) were observed for the eyes adapted in darkness. The threshold for the blue light was higher than that for the red.

1826

Miles, W. R. 1953c
LIGHT SENSITIVITY AND FORM PERCEPTION IN DARK ADAPTATION. — Jour. Optical Soc. Amer., 43 (7): 560-566. 1953.
DLC (QC350.06, v. 43)

The problem of designing and standardizing tests of scotopic vision for military purposes has claimed much attention. The light sensitivity tests (used in studies of avitaminosis) were discarded in the early 40's in favor of form perception tests for the armed forces, but the relation of the two types of tests remains a matter of scientific interest. By means of a supplementary form-target device designed for use in the Hecht-Shlaer adaptometer, data were collected on trained adult subjects for both light and form thresholds with 3° targets. Results are presented and analyzed for dark-adapted cone vision and rod vision, separately. Data are given showing the differing amounts and character of luminance necessary for cones and rods and for light versus perception of form (T) orientation. The close correspondence of these experimental findings to some results of recently released military research is shown, and the relation of these results to current visual theory on the stimulus characteristics of the retina is discussed. (Author's abstract)

1827

Miller, J. G. 1953
THE DEVELOPMENT OF EXPERIMENTAL STRESS-SENSITIVE TESTS FOR PREDICTING PERFORMANCE IN MILITARY TASKS. — Oct. 1953. 19+8+30+6 p. Psychological Research Associates, Washington, D. C. (Contract DA-49-083 OSA-611); issued by Adjutant General's Office (Army). Personnel Research Branch, Washington, D. C. PRB Technical Research Report no. 1079 (Project no. 29562000). AD 23 189
UNCLASSIFIED

The objective of the research described in this report was to find out if certain available tests were able to distinguish a man's reactions under stress conditions as opposed to his reactions in a normal situation. A review of the literature on stress reactions suggested nineteen testing procedures which might be useful in determining the presence of stress reactions. A number of situations which might produce stress reactions were also reviewed. The potentially stress-sensitive tests were pretested on 48 paratroopers making their first jump from the 34-foot mock tower. Analysis of the data from the pretests suggested that four of the tests might produce the desired measures: Critical Flicker Fusion at dim intensity, the Trembleometer, Cancellation of "C's", and the Primary Mental Abilities Word Fluency Test. These four tests were given to 500 pre-inductees under ordinary testing conditions and also under stress conditions induced by continuously sounding an 8000-cycle, 90-decibel noise while the men were taking the tests. The results of these trials were not conclusive; however, the Trembleometer

and the Critical Flicker Fusion tests appeared to warrant further study. (Author's summary)

1828

Miller, J. G., L. Bouthilet, and C. Eldridge 1953a
A BIBLIOGRAPHY FOR THE DEVELOPMENT OF STRESS-SENSITIVE TESTS — Psychological Research Associates, Washington, D. C. (Contract DA-49-038, OSA-611); issued by Adjutant General's Office (Army). Personnel Research Branch, Washington, D. C. PRB Technical Research Note no. 22, Oct. 1953. 1+125 p. (Army Project no. 29562000). AD 41 773
UNCLASSIFIED

A bibliography is compiled of references concerning the effects of stress and the measurement of these effects, as well as references to studies on anxiety and anxiety measurement, the effects of extreme or unusual environmental conditions, combat fatigue and war neuroses, physiological stress reactions, and various other related subjects. The bibliography consists of two sections: a list of references cited by title only, and a group of abstracts of the 118 most important references. The references are listed alphabetically by author. (AD abstract)

1829

[Miller, J. H.] 1953
STANDARDIZATION OF THE AIR FORCE-NAVY PILOT'S PNEUMATIC SUIT, TYPE ANTI-G. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-80, July 15, 1953. 2+19 p. (RDO no. R 689-18). AD 30 380
UNCLASSIFIED

The better features of the U.S. Air Force type G-4B and the U.S. Navy type Z-2 anti-g suits were combined and modified in an effort to produce a suit superior to both of the suits and acceptable to pilots of both services. The new suits differed from the Z-2 and the G-4A in that it incorporated larger abdominal bladders, internal lacing adjustments extending from crotch to knee and from the waist to the knee, basic cloth of 50% nylon-50% cotton combination, narrower tapes under the slide fasteners, and buttoned pockets located only on the lower legs and left arm. This suit was designated the model S-362-1, abdominal filling. Another suit, identical to the U.S. Air Force suit with the exception that the filling tube in this model extended beyond the mid-thigh area to the middle of the calf bladder, was designated model S-362-1, leg filling. Tests indicated no significant advantage for either inflation system. Centrifugal and flight tests on experimental Air Force-Navy anti-g suit indicated acceptability of this suit for use in the fighter aircraft of both services. (AD abstract)

1830

Miller, J. W., and E. Ludvigh 1953
DYNAMIC VISUAL ACUITY WHEN THE REQUIRED PURSUIT MOVEMENT OF THE EYE IS IN A VERTICAL PLANE. — Kresge Eye Inst., Detroit, Mich. (Contract Nonr-586(00)); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 075.01.02). Joint Project Report no. 2, May 11, 1953. 5+4 p.
AD 17 022 UNCLASSIFIED

The present investigation demonstrated the manner in which visual acuity deteriorates when the test object moves in a vertical plane, rather than a horizontal plane which has previously been investigated. The visual acuity was evaluated in terms of two coefficients, a and b. The a coefficient is a measure of static acuity and the b coefficient is a measure of dynamic acuity. The values of the two coefficients were shown not to be significantly dependent upon whether the motion of the test object was in a vertical or a horizontal plane. It was found that individuals who are velocity resistant or velocity sensitive to horizontal movement are affected similarly when the movement of the test object is in the vertical plane. It was suggested that the value of an individual's dynamic visual acuity is chiefly dependent upon the efficiency of the entire oculomotor pursuit mechanism rather than upon the strength of normal individual muscles. (Naval School of Aviation Medicine abstract)

1831

Miller, R. B. 1953
A METHOD FOR DETERMINING HUMAN ENGINEERING DESIGN REQUIREMENTS FOR TRAINING EQUIPMENT. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-22638); issued by Wright Air Development Center. Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-135, June 1953. iv+17 p. (RDO no. 694-44). AD 15 848 PB 117701

This report summarizes and integrates the reports, Miller, R. B., 1953, 1953a, and 1953c, each of which plays a role in a procedure intended to determine the human behavioral requirements of complex training devices. It is intended that the procedures described in these reports will help bring to bear, in a systematic way, the contributions of psychology and psychologists to the design of training devices and their optimal use. The following two phases which constitute the procedure are summarized: a method for performing a behavioral analysis of man-machine tasks; the application of a human engineering design schedule to the planning or improvement of a training device. A brief description is given of the Handbook on Training and Training Equipment Design and its applicability to the procedures described above. These materials and procedures are designed for use by trained personnel in the preparation of recommendations concerning the design and use of complex training devices. (Author's abstract)

1832

Miller, R. B. 1953a
HANDBOOK ON TRAINING AND TRAINING

EQUIPMENT DESIGN. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-22638); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-136, June 1953. xviii+339 p. (RDO no. 694-44).
AD 16 859 DLC (UG633.A3776, no. 53-136)

This handbook, intended as an aid to preparing recommendations on the design and use of training equipment, includes learning and transfer theory, principles applicable to training problems, and bibliographic references. Different tasks and degrees of learning are suggested to have different applications to training transfer presentations. Stages of learning and the knowledge of results are analyzed. Sections are devoted to: an overview of human learning; the role of the instructor in training; the trainer as a demonstrator of principles; the use of the knowledge of results; the problems of simulation; motivation; and the preparation of the specifications for a training device. 557 references. (AD abstract)

1833

Miller, R. B. 1953b
A METHOD FOR MAN-MACHINE TASK ANALYSIS. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-22638); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-137, June, 1953. v+60 p. (RDO no. 694-44). AD 15 921 PB 117702

This report describes a systematic procedure for making a task analysis of the operator's job in any man-machine system. The quality and quantity standards defined for the man-machine system are analyzed into constituent variables or functions. The operator is treated as part of the system's linkage from input to output functions. Information displayed to the operator is analyzed into essential discrimination requirements; control activations necessary to control the machine's output are analyzed into component "effector" or response requirements. Other behaviors include "discrimination of response adequacy", "memory storage," "decisions," "coordination," "anticipations," and "characteristic malpractices". Tasks are differentiated into discontinuous (procedural) and continuous (tracking). Formats for making the analysis are provided. The method, although of general applicability, is specifically designed for use by trained specialists in planning for training and training equipment. (Author's abstract)

1834

Miller, R. B. 1953c
HUMAN ENGINEERING DESIGN SCHEDULE FOR TRAINING EQUIPMENT. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-22638); issued by Wright Air Development Center Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-138, June 1953. iv+34 p. (RDO no. 694-44). AD 14 768 PB 110763

This report is an organization of several hundred considerations which, from the human engineering standpoint, are important to the relevance and efficiency of training equipment. These considerations are applicable to a training device during initial planning, specification, prototype, or production model stages of trainer development. The items of the Design Schedule are grouped under the following main topics: (1) designing a trainer to use as a demonstrator of principles; (2) controls; (3) displays; (4) control-display interactions; (5) programs; (6) scoring and error analysis; (7) motivation of the student; (8) conditions of practice and learning; (9) facilities for the instructor; and (10) research data on the task. (Author's abstract)

1835

Mil'shtein, G. I. 1952
[ON THE INFLUENCE OF LOWERED PARTIAL OXYGEN PRESSURE ON THE HIGHER NERVOUS ACTIVITY OF MAN] O vliianii partsial'nogo davleniia kisloroda na vysshuiu nervnuiu deiatel'nost' cheloveka. — Zhurnal vysshei nervnoi deiatel'nosti imeni I. P. Pavlova (Moskva), 2 (3): 352-357. 1952. In Russian. DNLM (W1.ZH425, v. 2)

To elucidate the effects of lowered partial oxygen pressure (to as low as 85 mm. Hg) on the higher nervous activity of man, the author applied A. G. Ivanov-Smolenskii's conditioned motor-reflex method with verbal reinforcement. The subject was placed into a barochamber provided with a telephone. Positive and negative conditioned reflexes of the first order (in respose to colored light stimuli) and of the second order (in response to sound stimuli) were first established; the atmospheric pressure and oxygen content were then decreased, and the conditioned motor-reflexes recorded. Results showed, first, an increase in positive conditioned motor reflexes and weakened differentiations. At 125 mm. Hg, protective inhibition developed, inducing the disrupture of the usual "power relations" (hypnotic phases). For example, the extent of the conditioned reflex was greater in response to a stimulus of weak light than in response to a strong light. With the increase and spreading of protective inhibition, a deep depression of established conditioned reactions set in, sometimes up to complete cessation, the most recently established reflexes being the first to be disturbed or to disappear. Peculiar to these experiments was the absence of a consistent relationship between the rate of oxygen decrease and disturbances in the higher nervous activity. The author attributes this fact to the dominant role of the subjects' "typological differences".

1836

Mil'shtein, G. I. 1953
[EXPERIMENTAL STUDY OF TYPOLOGICAL PECULIARITIES AND THEIR ROLE IN THE CHANGES OF HIGHER NERVOUS ACTIVITY UNDER THE INFLUENCE OF LOWERED PARTIAL OXYGEN PRESSURE] Opyt vyiavleniia tipologicheskikh osobennostei i ikh roli v kharaktere izmeneniia vysshei nervnoi deiatel'nosti cheloveka

pod vliîaniem ponizhennogo partsîal'nogo davleniîa kisloroda. — Zhurnal vysshe͡ĭ nervnoĭ deîatel'nosti, (Moskva), 3 (5): 728-737. 1953. In Russian. DNLM (W1.ZH425, v. 3)

An attempt was made to reveal the typological characteristics of 52 subjects and the dependence on these characteristics of changes in higher nervous activity under anoxic conditions. Results revealed that the influence of low oxygen pressure in the air consists basically in a relative intensification of the stimulation process, combined with considerable weakening of inner inhibition, and subsequent development of protective inhibition. In subjects characterized by strong stimulation and inhibition processes usually some decrease in conditioned reflexes was observed during hypoxia, revealing the appearance of protective inhibition. In subjects characterized by weak stimulation and inhibition processes, a sharp depression of conditioned reflex activity developed, to the point of cessation of the conditioned reactions, and a strongly pronounced deep protective inhibition set in. In subjects characterized by unbalanced stimulation and inhibition processes, changes in higher nervous activity under above circumstances depended on the intensity and interrelation of the processes of stimulation and inhibition.

1837

Min'kovskiĭ, A. Kh. 1952
[ON THE QUESTION OF INTERACTION BETWEEN SOUND AND VESTIBULAR ANALYSOR] K voprosu o vzaimodeistvii mezhdu zvukovym i vestibulîarnym analizatorom. — Vestnik oto-rinolaringologii (Moskva), 14 (5): 23-26. 1952. In Russian. DNLM

An investigation was carried out on 68 subjects with normal sound analysors to establish: (1) whether the sound analysor is altered during stimulation of the vestibular analysor by rotation, and (2) whether the reactions of the vestibular analysor are altered during sound stimulation. Hearing thresholds were usually found to be variously altered upon vestibular stimulation, with increases or decreases of thresholds depending on the sound frequency and on individual differences. The changes lasted 1-2 minutes; then conditions returned to normal. They were apparently due to positive or negative induction in the nervous centers. The rise in auditory thresholds after vestibular stimulation (45.6% of the cases) can be explained by negative induction. The lowering of the thresholds (25.2%) on the other hand is due to inhibition of the cortical vestibular centers which stimulates the neighboring auditory centers (positive induction). Mixed results (i.e., low threshold for low, high threshold for higher frequencies) were obtained in 13.2% of the cases. No marked autonomous reactions occurred in 85.6% of the cases when vestibular stimulation was preceded and followed by sound stimulation, even among many subjects who could not usually tolerate rotation. The post-rotatory nystagmus was of usual duration (15-25 sec.), but with a small amplitude of eye movement. This marked decrease of autonomous reactions after rotation as a result of preceding and subsequent sound stimulation can be explained by negative induction.

1838

*Mirrakhimov, S. M. 1952
[THE INFLUENCE OF PROLONGED SOJOURN AT AN ALTITUDE OF 1600 METERS ON THE CARDIO-VASCULAR SYSTEM] Vliîanie dlitel'nogo prebyvaniîa na vysote 1600 m. na serdechno-sosudistuîû sistemu. — Sovetskoe Zdravokhranenie Kirgizii (Frunze), 1: 23-28. 1952. In Russian.

Arterial and venous blood pressure and the function of the cardiovascular system in general during physical work (16 circular ascents on stairs at 2 minutes each) were tested in healthy men, 19 to 40 years of age, one half to 5 years after they moved to the Lake Issyk-Kul' region (1600 m. altitude). Heart contraction was found to slow down in many instances; systolic pressure did not change much, while diastolic pressure often increased. Venous pressure remained either unchanged or increased up to 27.6%. The rate of circulation and capillary blood flow was found to be reduced in many cases. Other circulatory reactions in response to controlled physical effort were mostly normal. Observed hemodynamic changes cannot be considered pathological; they are apparently linked to the processes of physiological adaptation to altitude, especially as far as the circulatory system is concerned. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (20): 26. DNLM (ZW1.qS729)].

1839

Mithoefer, J. C., 1953
C. D. Stevens, H. W. Ryder, and J. McGuire
LUNG VOLUME RESTRICTION, HYPOXIA AND HYPERCAPNIA AS INTERRELATED RESPIRATORY STIMULI IN NORMAL MAN. — Jour. Applied Physiol., 5 (12): 797-802. 1953. DLC (QP1.J72, v. 5)

Experiments were designed to evaluate the relative importance and interrelationships of hypoxia, hypercapnia and restricted lung volume in the voluntary control of respiration in normal subjects. The results indicate that these three factors have an additive effect in the production of the net respiratory stimulus. If the influence of restricted lung volume is removed by hyperinflation of the lungs, the net respiratory stimulus is reduced. Conversely, if the lungs are deflated, the net stimulation is increased (p. 797).

1840

Mixter, G. 1953
RESPIRATORY AUGMENTATION OF INFERIOR VENA CAVAL FLOW DEMONSTRATED BY A LOW-RESISTANCE PHASIC FLOWMETER. — Amer. Jour. Physiol., 172 (2): 446-456. 1953. DLC (QP1.A5, v. 172)

A flowmeter employing a combination of Pitôt and resistance meter principles is described, and

its applicability to vena caval flow studies is presented. By simultaneously recording flow rates from the thoracic and abdominal portions of the inferior cavae of anesthetized dogs, along with appropriate pressure registrations, the following basic observations were made: (1) Inspiration does, under physiological circumstances, cause significant augmentation of return flow to the heart via the inferior cava. (2) Two forces are commonly involved: abdominal compression and thoracic suction. (3) These forces ordinarily supplement one another in maintaining venous return but either one is capable of acting separately. (4) The forces governing the occurrence of extrathoracic venous collapse previously described for the superior cava obtain as well in the inferior cava. In addition, elevation of abdominal pressure tends to enhance the tendency toward collapse. (Author's summary)

1841

Mörikofer, W. 1953
[CHARACTERISTICS AND EVALUATION OF THE HIGH-MOUNTAIN CLIMATE] Kennzeichen und Beurteilung des Hochgebirgsklimas. — Medizinische Monatsschrift (Stuttgart), 1953 (19): 642-645. In German. DNLM

The therapeutic advantages of high-mountain climates are discussed. During the warmer seasons, the intensity of moderate ultraviolet radiation (UV) is approximately 1½-2 times greater at 1600 m. than at sea level, and 3-4 times greater in winter than in summer. The increase in UV intensity per 100 m. elevation is about 3-10% in summer and 10-20% in winter. Insolation and radiation intensity increase with altitude, while the temperature of the air decreases. The result is a cooling effect, which has a stimulating influence on the heat regulation mechanism of the body. Absolute atmospheric humidity decreases. Decrease of air pressure and oxygen content up to 2000 m. cause an increase of respiratory rate and depth, and of erythrocyte production.

1842

Monier, M. M., 1953
S. S. Byer, and R. J. Weiss
THE EFFECT OF STRESS ON THE METABOLISM OF ASCORBIC ACID. III. CHANGES IN TISSUE LEVELS OF ASCORBIC, DEHYDROASCORBIC AND DIKETOGULONIC ACIDS IN THE RAT EXPOSED TO COLD. — Sept. 1953. iii+2 p. George Washington Univ., Washington, D. C. (Contract AF 33(038)-16196); issued by School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-1208-0001, Report no. 3). AD 19 617 PB 112263

Adult albino rats were exposed to environmental temperatures of 21° C. for controls, and 0° C. for experimental animals, for 72 hours prior to sacrifice. The adrenal and kidney tissues of the experimental rats showed no increased levels of ascorbic acid, dehydroascorbic acid, and diketogulonic acid from the controls. The liver tissue of the experimental animals had significantly decreased levels of ascorbic acid, and increased levels of dehydroascorbic acid, from those shown by the controls. (Authors' abstract)

1843

Monjauze, R., 1953
F. Plas, G. Verdeaux, J. Verdeaux,
J. Bourdinaud, A. Missenard, and R. LeFebvre
CLINICAL RESEARCH ON THE SUBJECT OF A TEST ON AVIATOR'S FATIGUE. — Jour. Aviation Med., 24 (2): 143-145. 1953. [Translation from French.] DLC (TL555.A1A4, v. 24)

Preliminary studies were made on flying personnel subjected before and after prolonged flights to a battery of tests devised to diagnose symptoms of fatigue. In the first test cardiovascular reactions were observed during voluntary apnea after forced expiration. In the second test electroencephalographic tracings were made while subjects were resting, after "three days [?] of hyperapnea", and following intermittent luminous stimulation. The third group consisted of psycho-technical tests: Barrier Test, Test of Numeric Operations, and Reaction Time. The authors state that no conclusions can be made at this time, but that evidence is present which indicates that flying personnel suffer a fatigue from which the individual is not sufficiently recovered each day.

1844

Montagard, F. 1953
[SYSTEMATIC X-RAY EXAMINATION OF THE SPINAL COLUMN BEFORE ENTERING EJECTION SEAT TRAINING] Examen radiologique systématique de la colonne vertébrale (avant stage d'entraînement au siège éjectable). — Médecine aéronautique, (Paris) 8 (3): 243-248. 1953. In French. DLC (TL555.M394, v. 8)

X-ray examination of the spinal column of fighter pilots to be trained in the use of ejection seats has the triple purpose to detect diseases of the bone, traumatic lesions or their sequelae, and anomalies of the spinal column and body structure in general. This article is primarily concerned with the latter aspect, expecially with the timely detection of disorders of the equilibrium or of a slipped disk. The standing position was standard for the spinal X-ray examination, but a few pictures were also taken in the ventral position. In the majority of the cases the spinal column showed no abnormalities. Among the pathological conditions detected, the most interesting were: a case of flattening of two vertebrae, agenesia of the disk of the second and third cervical vertebrae, and bilateral spondylolysis of the posterior arc of the fourth and fifth lumbar vertebrae. Spinal malformations are not always indicative of elimination from ejection-seat training; however, anomalies of the lower lumbar column have to be watched carefully.

1845

Moore, J. C. 1953
DESIGN OF HAND RESUSCITATORS. — In:

Chem. Corps Med. Labs., Conference on artificial respiration, p. 69-81. Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19. April 1953. AD 9582. PB 109598

The following three bellows resuscitators are evaluated and compared: Type I., the Kreiselman Bellows Model 110; Type II., the British Bellows Model MK1; and Type III, the double bellows resuscitator. The relative efficiency of these resuscitators is best tested by the calculation of the work required to overcome elastic forces. This is directly proportional to the elastic constant, to frequency, and to the square of the tidal volume. Among the bellows tested, Type I. proved to be the most efficient (the volume is only 1.5 l. and its positive relief valve is set higher). From data on 0_2 consumption and theoretical considerations it is assumed that a stroke volume of approximately 1 l. would be most likely to result in minimum work when operating the bellows.

1846

Moore, J. V. 1953
A FACTOR ANALYSIS OF SUBORDINATE EVALUATIONS OF NONCOMMISSIONED OFFICER SUPERVISORS. — Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base, Ill. Research Bulletin 53-6, April 1953. v+29 p. (Project no. 507-009-0001). AD 14 722 PB 110718

A study was made to determine the factors in the leadership and supervisory activity of noncommissioned officers (NCO) in the Air Training Command. Emphasis was on identifying personal and work characteristics associated with effectiveness in supervision. The NCO supervisors were evaluated in terms of 54 aspects of leadership behavior by administering questionnaires to 1305 subordinate NCO supervisors. Correlations among 34 representative items from the questionnaire were analyzed. An important factor in the evaluations by subordinates was the general over-all impression of the supervisor as a leader. Evaluations were also made on the basis of intelligence and job competence. The analysis of responses to items on the questionnaire revealed two other factors; one related to personal habits, and the other related to disciplinary strictness. Evaluations of supervisors in terms of questionnaire items dealing with the latter factors were almost completely unrelated to evaluations in terms of the broader leadership, intelligence, and job-competence considerations. (AD abstract)

1847

Moore, J. V. 1953a
FACTOR ANALYTIC COMPARISONS OF SUPERIOR AND SUBORDINATE RATINGS OF THE SAME NCO SUPERVISORS. — Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base, Ill. Technical Report no. 53-24, July 1953. v+17 p. (Project no. 507-009-0001). AD 19 005 UNCLASSIFIED

A factor analysis of supervisory ratings of 283 noncommissioned officer (NCO) supervisors resulted in the identification of 6 factors concerning the leadership traits and characteristics of the subject: general leadership ability, discretion, tact, military demeanor, personal adjustment, and motivation. These factors were compared with 4 other factors derived from a factor analysis of subordinate ratings of the same NCO supervisors. A resemblance was noted between the general leadership ability factor from the supervisor analysis and the general leadership factor from the subordinate analysis, and between the supervisor military demeanor factor and the subordinate competence factor. No correspondence was found between the remaining factors. The lack of correspondence was interpreted as evidence of a relationship between rank or status and the subject's perceptions of NCO leadership qualities. The variables present in the general leadership factors common to both the subordinate and supervisor analyses might provide a basis for identifying the leader who is effective from both the subordinate and supervisory viewpoint. (AD abstract)

1848

Morehouse, L. E. 1953
PILOT FITNESS, DEVELOPMENT, AND MAINTENANCE. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 67-70. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Man-controlled flight of high-performance aircraft will depend upon the relative adaptation of the aircraft and on the selection, training, and conditioning of personnel. Basic biochemical and physiological research may provide means of improving man's response to stress and hasten his recovery from fatigue. At present, the best approach to fitness appears to be through a balanced diet of essential foods in sufficient quantity to sustain normal weight, frequent rest periods, and regular exercise. Motivation must be maintained at a high level. It is on these bases that future flight programs may be designed. (From the author's summary).

1849

Morin, R. E., and D. A. Grant 1953
SPATIAL STIMULUS-RESPONSE CORRESPONDENCE: PERFORMANCE ON A KEY-PRESSING TASK AS A FUNCTION OF THE DEGREE OF SPATIAL STIMULUS-RESPONSE CORRESPONDENCE. — Univ. of Wisconsin, Madison (Contract AF 18(600)-54); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-292, Oct. 1953. v+22 p. (RDO no. 694-49). AD 23 332 UNCLASSIFIED

This report describes an experiment to determine the effects upon speed and accuracy resulting from systematic variations in indicator-control arrangement. The indicators (stimuli) were eight

red lights arranged in a row on a display panel. The subjects operated a finger keyboard of eight controls (response keys), likewise arranged in a row. Any light could be made the stimulus for any response key, and it was through this mechanism that spatial stimulus-response correspondence was varied. Performance with direct correspondence between the stimulus lights and response keys was found to be very much superior to all other conditions studied. Change from direct correspondence multiplied the average time per unit of work by a factor of two to four and increased errors by a factor of four to fifteen. Performance with direct correspondence was also found to be relatively independent of a supplementary source of visual information feedback and relatively free from interference training. (From the authors' abstract)

1850

Morsh, J. E., 1952a
and E. W. Wilder
REVIEW OF STUDIES ON THE EFFECTIVENESS OF WOMEN AS INSTRUCTORS. — Human Resources Research Center. [Technical Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. TECH 52-6, July 1952. 4p. (Project no. 507-010-0005). AD 76 429
UNCLASSIFIED

Although further research would be required to assess the effectiveness of WAFs and civilian females as instructors in Air Force technical schools, the findings of past research reviewed in this research note provide basis for the conclusion that in a variety of instructional situations, female instructors have proven as competent as have male instructors, and in many situations have appeared to exhibit superior competence. Attention may profitably be directed towards determining those specialities in which female instructors can be effectively substituted for airmen and male instructors. (From the authors' conclusions)

1851

Morsh, J. E., 1953
J. M. Donze, and J. E. Burks
JOB SATISFACTION OF AIR FORCE TECHNICAL SCHOOL INSTRUCTORS – 1950 AND 1953. — Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base, Ill. Technical Report 53-8, May 1953. vi+10 p. (Project no. 507-010-0005). AD 18 958 UNCLASSIFIED

An investigation of the attitudes of Air Force technical school instructors was made to determine the factors in job satisfaction. A 28-item survey questionnaire was administered to a random sample of 1351 airmen civilian instructors at 7 training bases. The responses were tabulated and compared with responses made to the same items in a prior study. Some marked differences were found pertaining to the following areas: instructor reenlistment, the career program, cross training and rotation of instructors, allocation of responsibility to avoid conflicting or overlapping channels of authority, recognition of ability and effort, instructor participation in decisions affecting his job, development of individual identification with the school organization and program, the handling of grievances and dissatisfactions, instructor continuation training, and promotion problems. (AD abstract)

1852

Moseley, H. G. 1953
MEDICINE AND THE CURRENT MILITARY EFFORT. — U. S. Armed Forces Med. Jour., 4 (8): 1107-1118. 1953
DLC (RC970.U7, v. 4)

Military medicine has many responsibilities in the current military effort. These go far beyond the care of the sick and injured and the prevention of disease and disability. Medical officers must specialize in certain military medical fields, participate in research in unusual areas, contribute to military planning, adapt themselves to rapid change and mobility, undertake measure of preparedness, and some must take up careers in military medicine. The practice of medicine must be intelligently organized within the Armed Forces if it is to be efficient in its contributions. The merging of the medical services of the Army, Navy, and Air Force would not increase medical efficiency; on the contrary, it would compromise medical effectiveness. The current organization of 3 separate medical departments under the control and guidance of an Assistant Secretary of Defense (Health and Medical) is an appropriate structure under which the profession of medicine can contribute to the defense of our nation. (Author's summary)

1853

Mote, F. A., 1952
and E. C. Reed
THE EFFECT OF EXTENDING THE DURATION OF VARIOUS LIGHT-DARK RATIOS OF INTERMITTENT PRE-EXPOSURE UPON DARK ADAPTATION IN THE HUMAN EYE. — Jour. Optical Soc. Amer., 42 (5): 333-338. 1952.
DLC (QC350.O6, v. 42)

The influence of intermittent versus continuous preadaptation upon subsequent dark adaptation was investigated for two durations of the continuous: 1 1/2 and 3 minutes. The rate of intermittence for the discontinuous condition was 1 cycle/second, and four light-to-dark ratios were employed. The pre-exposure intensities were 8860, 886, 88.6, and 8.86 mL. Differences were found for most of the cases in which a comparison was made between the curves of dark adaptation following the two conditions of preadaptation. For the intermittent condition at the highest pre-exposure intensity, it was found that the shorter the lighttime in the ratio, the lower the initial threshold tended to be and the more rapidly the final dark adapted threshold was reached. At the two lower intensities the initial thresholds for both the intermittent and continuous curves were approximately the same, but the curves for the intermittent were markedly retarded in reaching the final level of dark adaptation. (Authors' abstract)

1854

Mote, F. A., 1952a
and E. C. Reed

THE EFFECT OF HIGH INTENSITY AND SHORT DURATION VERSUS LOW INTENSITY AND LONG DURATION OF INTERMITTENT PRE-EXPOSURE UPON HUMAN DARK ADAPTATION. — Jour. Optical Soc. Amer., 42 (8): 521-525. 1952.
DLC (QC350.O6, v. 42)

The influence of intermittent pre-exposure upon subsequent dark adaptation was investigated for two intermittent conditions. In one condition the intensity was increased in the same proportion as the amount of light time in the light-dark ratio was decreased, keeping duration constant. In the other, intensity was constant but the duration was extended to compensate for variations in light-time. Both conditions were compared with equivalent control pre-exposures to continuous light. The control intensities and durations were 140, 281, and 562 mL and 1 and 3 minutes. The rate of intermittence was 1 cycle/second, and four light-to-dark ratios were used. The curves of dark adaptation obtained after intermittent pre-exposures of constant duration but different intensities were almost identical with those after the equivalent control pre-exposure. This was not so for the intermittent pre-exposures of constant intensity but different durations; after the longer durations, dark adaptation was much slower than after the equivalent control condition. (Authors' abstract)

1855

Mote, F. A., and A. J. Riopelle 1953
THE EFFECT OF VARYING THE INTENSITY AND THE DURATION OF PRE-EXPOSURE UPON SUBSEQUENT DARK ADAPTATION IN THE HUMAN EYE. — Jour. Compar. and Physiol. Psychol, 46 (1): 49-55. 1953. DNLM

Dark adaptation was measured (with the authors as subjects) following various combinations of intensities and durations of pre-exposure for four different intensities (in milliLamberts) and durations. The pre-exposure stimulus was white, and the threshold-testing stimulus was violet. (1) The initial threshold rises, and recovery of dark adaptation is retarded when either pre-exposure intensity or duration are increased, the other factor being constant. (2) Increases in pre-exposure intensities raise the initial threshold more than an extension of duration, however. (3) Variations in color thresholds can be noted at the end of the test stimulus (i.e., colored stimuli are better seen at lower threshold values after pre-exposure to low intensities than to high intensities). (4) Investigations of the reciprocity relationships of pre-exposure intensities and time (I x t = C) show little or no difference in the course of dark adaptation following exposures to 3,320 mL/sec. and below. Higher degrees of pre-exposure (33,200 and 332,000 mL/sec.) show marked differences in dark adaptation.

1856

Mowbray, G. H. 1952
SIMULTANEOUS VISION AND AUDITION: THE DETECTION OF ELEMENTS MISSING FROM OVERLEARNED SEQUENCES. — Jour. Exper. Psychol., 44 (4): 292-300. 1952.
DLC (BF1.J6, v. 44)

Ten subjects were required to detect elements missing from alphabets and numeral sequences when such sequences were presented simultaneously to the two senses in one of four combinations--visual alphabet with auditory alphabet, visual numeral with auditory numeral, visual alphabet with auditory numeral, or visual numeral with auditory alphabet. Performance on the simultaneous trials was compared with nonsimultaneous performance of the same conditions. Analysis of performance was made on the basis of errors of omission, or deleted elements which were not reported as missing, and errors of commission which were elements reported as missing which were not in fact missing. For nonsimultaneous operation more errors of omission were made with the alphabet sequences. More auditory than visual errors of omission were committed with the numeral sequences. With the alphabet sequences, there was no significant difference between the visual and auditory errors of omission. For nonsimultaneous operation, four to five times as many errors of commission were made with the auditory sequences as with the visual sequences. Increase in the number of errors of omission from nonsimultaneous to simultaneous trials because of the conflicting nature of the material was not significantly greater for one modality or the other. Increase in the number of errors of commission from nonsimultaneous to simultaneous trials was significantly greater for the visual trials than for the auditory. (From the author's abstract)

1857

Müller, C. 1953
[RETENTION OF NEUROSIS-SUSPECT CANDIDATES AT THE PILOT SCHOOL] Die Bewahrung neuroseverdächtiger Anwärter in der Pilotenschule. — Vierteljahrschrift für schweizerische Sanitätsoffiziere (Basel), 30 (1): 39-49. 1953. In German. DNLM

An intensive psychological follow-up study was carried out on 18 candidates for pilot training under suspicion of neurosis, who had been accepted because of otherwise excellent qualifications. Neurosis was indicated on the basis of the candidates' case histories and personality and behavior traits, as well as Rorschach test results. Ten of the candidates had to be dropped out during the first part of the course, 8 candidates graduated, but only 5 of these qualified for combat duty. Comparisons of the graduate and failure groups showed no difference in case histories, physical data, or Rorschach test results. Both groups manifested a pronounced lability of the autonomous nervous system. However, indications of failure might have been deduced from such behavioral symptoms as inhibitions (timidity, agressiveness, tenseness in their relations with others) predominance of a severe, unsolved father-son problem, a tendency towards psychosomatic disturbances, and, as a

decisive factor, an incapacity of controlling fear. On the other hand, it was observed in the "success group" that they were able to control their emotional disturbances and succeeded in adjusting themselves to military discipline. They were often genuinely unable to understand their neurotic problems. --- It is concluded that there is no sure way of predicting qualifications for combat flight. Hence, high standards for selection are fully justified.

1858

Mugnaini, E. 1952
[OTO-RHINO-LARYNGOLOGY] Otorinolaringologia. — 187 p. Firenze: Scuola di Guerra Aerea, 1952. In Italian. DNLM (WV100.M9510, 1952)

This transcript of a course for students in aviation medicine deals with the following subjects: oto-rhino-laryngology and legal aspects of military aviation medicine; the external and middle ear; appraisal of military accidents; hearing and auditory examination; appraisal of acoustic loss in legal medicine; acoustic traumata and professional deafness; the vestibular apparatus and pilot performance; aerosinusitis; diseases of the pharynx and pharyngeal examination; and diseases of the larynx and esophagus.

1859

Mullin, C. S. 1953
ACUTE ANXIETY REACTION VERSUS "BLAST CONCUSSION". — U. S. Armed Forces Med. Jour., 4 (12): 1748-1752. 1953.
DLC (RC970.U7, v. 4)

Of 115 consecutive patients bearing a diagnosis of blast concussion (cerebral), admitted to a forward medical company in Korea, 105 appeared to be suffering mainly from a form of acute anxiety. The evidence presented indicates that this acute syndrome, resulting from exposure to a nearby explosion, is usually best understood as a psychologic reaction to overwhelming "threat", rather than as the primary consequence of brain injury. (Author's summary)

1860

Murphy, W. F. 1953
PSYCHOSOMATIC DISORDERS IN THE SERVICE. — U. S. Armed Forces Medical Jour., 4 (7): 1003-1009. 1953 (DLC (RC970.U7, v. 4)

Patients with mild psychosomatic disorders do not represent difficult psychiatric problems. Insight therapy on a long-term basis is not feasible and should not be attempted by inexperienced personnel. Treatment while in the military service should be prompt, symptomatic, and superficial. Minor and moderately severe disorders can and should be treated on a medical service with or without psychiatric help. The only patients who should be referred to a neuropsychiatric service for extended treatment are those whose psychosomatic disorder is severe, chronic, or secondary to a neurotic breakdown or psychosis. In these patients, all adjunctive aids and activities should be used. In war when there is a shortage of doctors, the ancillary service personnel, including attendants, corpsmen, and nurses, should be trained to help the patients to discuss superficial emotional problems. Such training should be given at a simple level. Job classification and morale building are important both in the prevention and treatment of these disorders. Most of these patients can function adequately in an environmental setup peculiar to their individual needs and will respond to simple measures. (Author's summary)

1861

Murray, J. E. 1953
AN EVALUATION OF TWO EXPERIMENTAL CHARTS AS NAVIGATIONAL AIDS TO JET PILOTS. — Jour. Applied Psychol., 37 (3): 218-222. 1953. DLC (BF1.J55, v. 37)

The major objective of this study was to devise and apply experimental techniques through which data could be obtained and form the basis on which principles of chart construction could be evaluated. In evaluating navagational charts, data were obtained from readability tests, from an analysis of test items, and from pilot preferences on a questionnaire. The results indicate that the two experimental charts designed for navigation in high-speed, high-altitude aircraft are superior to traditional charts in presenting information for cross-country missions. On an over-all basis, the experimental charts are not statistically different from one another. However, there are several features on each chart which appear to be highly effective in presenting navigational information to the pilot. It seems apparent, therefore, that the ideal chart for navigation in high-speed, high-altitude aircraft should include the desirable features of each chart with further experimentation to determine the effectiveness of their interaction. (From the author's summary)

1862

Murrell, K. F. H., 1952
S. J. Murch, N. G. Suffield, and N. J. Morley
A COMPARISON OF THREE DIAL SHAPES FOR CHECK-READING INSTRUMENT PANELS. — Naval Motion Study Unit (Gt. Brit.). Report no. 40 Feb. 1952. 9+12 p. (ACSIL/ADM/52/108).
AD 123 757 UNCLASSIFIED

Tests were conducted to determine the effectiveness in a watch-keeping situation of the following types of indicator shapes: (1) circular with moving pointer, (2) vertical linear with moving pointer, and (3) vertical linear with moving scale. A total of 72 subjects were used for the experiment. Each subject was instructed to indicate by means of a key whether any of the three dials on the simulated panel pointed outside the "safe band". The response times and the number of misses were recorded. From the tabulated results it appears that the difference of reaction times in response to the three types of dials is negligible. No significant practice effect of deterioration from one session to the next could be associated with any particular panel.

1863

Murrell, K. F. H., 1952a
and C. McCarthy
DIRECTION OF MOTION RELATIONSHIPS BETWEEN VALVES AND GAUGES WHEN MOUNTED IN PANELS: RESULTS FROM A

PRINTED TEST. — Naval Motion Study Unit (Gt. Brit.). Report no. 51, Feb. 1952. 4+1 p. (ACSIL/ADM/52/147). AD 123 756
UNCLASSIFIED

Diagrammatic questionnaires were submitted to a selected group of operators to determine the relationship between controls and associated displays of the following order: (1) all controls were turned anti-clockwise-to-increase, irrespective of pointer movements; (2) all controls were turned clockwise-to-increase, irrespective of pointer movement; and (3) controls were turned in the "expected" direction in relation to the pointer irrespective of pointer movement. It was concluded that the operators were prone to follow the pointer, whether this involved making a clockwise or anti-clockwise movement to increase. Of the various arrangements of dial shapes and controls tested, those giving the most consistent responses were two with a horizontal and one with a vertical linear scale. The superiority of the linear scales over the circular scales was very marked.

1864

Nachman, M. 1953
THE INFLUENCE OF SIZE AND SHAPE ON THE VISUAL THRESHOLD OF THE DETECTABILITY OF TARGETS. — Boston Univ. Optical Research Lab., Mass. Technical Note no. 109, Dec. 1953. 5+53 p. (Contract AF 33(616)-432). AD 25 410
UNCLASSIFIED

An equation suggested by Lamar, Hecht, Shlaer, and Hendley (Jour. Optical Soc. Amer., 47:531-545, 1947) stated that the contrast, $\triangle I/I$, (where I indicates the background intensity and $\triangle I$ the difference between target and background), required to detect a rectangular target, was a positive function of the area within 1.5 minutes from the edge of the target. This area was defined as the "useful area". Experiments were performed to test predictions made from the equations of Lamar et al. To discover whether edge rather than area was indeed the crucial variable in a subject's threshold for discrimination, rectangular test objects which varied in area but had a constant amount of edge (measured in terms of the perimeter and useful area) were presented, and were found to have equal thresholds as predicted. Stimuli composed of two rectangles were also used, and the sum of the edges of each was again found to determine the threshold. (Author's abstract, modified)

1865

Naumann, H. H. 1953
[ULTRASOUND AND THE AURICULAR REGION] Ultraschall und Ohr-Region. — Acta oto-laryngologica (Stockholm), 43 (4-5): 457-460. 1953. In German. DNLM

Various portions of the ear and brain previously exposed to ultrasonic vibrations (US) were examined histologically. After exposure to small US doses, focal tissue alterations were observed. Upon exposure to stronger doses, these foci became more numerous, extending and converging partially. At very high intensities, large tissue areas were altered or destroyed. Bone metabolism may be affected by relatively small doses of ultrasound. The bones of a young animal react stronger to US than those of older animals. The labyrinth bone undergoes reducing processes in all of its three layers. Morphological changes in the soft tissues of the inner ear occur only after application of relatively high US doses. A striking characteristic is the pronounced general neoformation of conjunctive tissue. Meningitic symptoms may be elicited by US in complete absence of infection. Damage to the brain occurs mostly in the cerebellum, but, at higher intensities, the cerebrum also presents large surface destruction. To induce immediate damage, greater US intensities are required than to induce delayed damage. There is a possibility of cumulative effects of single, harmless doses to produce manifest damage. --- Results of these animal experiments cannot be applied to man directly. Nevertheless, exposure to ultrasonic vibration cannot be considered harmless to men.

1866

(Naval Air Test) 1953
EVALUATION OF CABLE-CONNECTED, BODY-MOUNTED SEADROME LIGHTS. — Naval Air Test Center, Patuxent River, Md. Report no. 1 (Final Report), April 30, 1953. ii+4+6 p. (Project TED no. PTR SE 221). AD 10 413
UNCLASSIFIED

Evaluations were made of two cable-connected buoy-mounted seadrome lights, one of which was a fluorescent type and the other an incandescent type, to determine which light was more suitable for marking the limits of safe landing areas for seaplane operations. Tests were also made of a new type of riser-anchor cable. Various modifications were made to the equipment during service tests. The fluorescent light was found to be preferable for seadrome lighting. The new type of riser-anchor cable was not satisfactory for anchoring seadrome buoys because of consistent breakage in rough weather. All objectives of the project were not accomplished completely because of the loss of one buoy and severe damage to the other buoy during a storm. (Naval Air Test Center abstract)

1867

(Naval School Aviat. Med.) 1953
PROGRESS REPORT AND THE RESULTS OF A DECADE OF RESEARCH AT THE SCHOOL OF AVIATION MEDICINE, PENSACOLA, FLORIDA. — Naval School of Aviation Medicine, Pensacola, Fla. May 1, 1953. 82 p. AD 20 395
UNCLASSIFIED

Titles are listed of 308 research projects completed during the last 10 years at the Naval School of Aviation Medicine. Brief progress reports are presented for 52 other projects. (AD abstract)

1868

Naviazhskiĭ, G. L. 1953
[ACOUSTIC-PHYSIOLOGICAL CHANGES IN THE AUDITORY ANALYSOR UNDER THE INFLUENCE

OF INDUSTRIAL NOISE] Akustiko-fiziologicheskie izmeneniia v slukhovom analizatore pod vliianiem proizvodstvennogo shuma. — Vestnik oto-rino-laringologii (Moskva), 15 (5): 18-22. 1953. In Russian. DNLM

Audiometric studies were carried out on 63 industrial workers with normal hearing, 2 to 4 hours after exposure to noise ranging in frequency from 200 to 300 c.p.s. and in intensities from 95 to 108 db., over a period of one year and a half. The first measurements showed a rise in auditory thresholds in all the cases, covering a range from 12 to 42 decibels. A second measurement, 2 to 3 minutes later, showed a lowering of threshold in 40% of the cases; in the remainder of the cases a rise or no change of the preceding threshold was observed. A one-hour rest from noise hardly changed the threshold. A relationship was found to exist between sound frequency and restoration of hearing, the auditory threshold being lowered in 85% of the subjects after exposure to low sound frequencies. Other factors, such as noise intensity, length of service on the job, age, etc. did not seem to exert any influence on auditory thresholds. The degree of auditory threshold rise was found to fluctuate widely even in the same subject on different days, which indicates an influence of functional processes of the individual organism on hearing. The author concludes that strong noise, at first, overstimulates the central nervous system; then, in accordance with the law of defensive inhibition, an inhibitory reaction sets in, which may become chronic and disrupt the normal balance between the processes of stimulation and inhibition. Low-frequency sounds counteract the inhibiting factor.

1869

Neely, J. C. 1953
A SPEED-OF-PERCEPTION MEASUREMENT APPARATUS. — Brit. Jour. Ophthalmol. (London), 37 (7): 439-443. 1953. DNLM

This illustrated article shows a portable device for measuring visual-perception speed. The apparatus can be used in decompression chambers or during flight. Since perception speed may be reduced with practice, the measuring device serves as an important training aid. Preliminary measurements were made on 1000 male subjects to test for (1) average perception speed of different age groups for near-to-far perception, (2) perception speed related to maximum power of accommodation in young adults, and (3) perception speed related to muscle balance.

1870

Neely, J. C. 1953a
VISUAL PROBLEMS OF AVIATION. — Medical Press (London), 229 (8): 167-173. 1953. DNLM

Visual problems associated with flying are discussed, with regard to airline passengers as well as to the crew. Extensive use of pressurized cabins and lack of visual tasks have minimized the extent of visual problems, as far as the passengers are concerned. There is only a slight possibility that glaucoma or retinal or vitreous hemorrhage may occur as a result of normal air travel. Absence of visual defects should be a prerequisite for the selection of flying personnel. However, in the course of flight duty, certain defects might show up, such as slow reaction time, night blindness, inadequate visual acuity, and lack of ocular muscle balance. Excessive temperatures, vibrations, altitudes, and speeds may also affect the visual performance of the crew. Oculogravic, oculogyral, and autokinetic illusions may create performance problems. Other physiological considerations that may affect vision during flight are: anoxia, low barometric pressure, decompression sickness, and acceleration.

1871

Neff, W. D. 1953
HEARING LOSSES AND PROTECTIVE MEASURES. — In: Benox report: an exploratory study of the biological effects of noise, p. 37-46. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

Brief (one minute) exposures to sound pressures of 150 decibels can be considered safe, but repeated exposures should not exceed 140 db. Jet engine noise on the ground is far above the safety level. Surveys reveal that men exposed to jet noise suffer greater permanent hearing loss than men of comparable age in the normal population. Time of recovery from temporary hearing loss, as incurred in propeller-driven planes, varies to some extent with the degree of initial loss. Audiographs are presented, from people exposed to noise of a J-48 jet engine mounted outdoors. Ear defenders considerably cut down the extent of temporary hearing loss. The V-51R insert type ear defender is among the best so far developed by the Armed Forces. Satisfactory over-the-ear protectors have not as yet been developed.

1872

Neff, W. D. 1953a
COMMUNICATION. — In: Benox report: an exploratory study of the biological effects of noise, p. 61-63. Univ. of Chicago, Ill. Dec. 1, 1953. (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

Previous studies on masking of voice communication by ambient noise are reviewed. Contrary to expectations, the wearing of ear defenders (e.g., the V-51R type) slightly improves intelligibility of speech in an ambient noise of 85 decibels and above, such as encountered in the vicinity of jet engines. Visual communication by way of standardized hand signals is a necessity where several jet engines are operating instantaneously such as on deck of an airplane carrier.

1873

Newsom, B. D., and D. J. Kimeldorf 1953
INCREASED TOLERANCE TO HYPOXIA IN IRRADIATED AND IN FOOD DEPRIVED RATS. —

Naval Radiological Defense Lab., San Francisco, Calif. Report no. USNRDL-414, Aug. 6, 1953. 20 p. (Project no. NM 006 015). AD 25 352 PB 118941

The survival rates for groups of rats exposed to lethal levels of hypoxia in an altitude-simulating chamber were determined at various intervals after X irradiation. Irradiated rats were significantly more resistant to the lethal effects of hypoxia than nonirradiated controls. This effect disappears approximately 5 days following 500 or 600 r total body irradiation. Since the increase in tolerance occurred during the post-irradiation anoretic period, a study was made to determine the effects of food deprivation upon the hypoxic tolerance of nonirradiated animals. When deprived of food for 72 hours, nonirradiated animals exhibited an increase in hypoxic tolerance comparable to that of irradiated animals. A similar change in tolerance after irradiation was noted when the duration of survival time under conditions of asphyxiation was used as the test criterion. The increased tolerance of irradiated rats to these conditions appears to be, at least in part, a consequence of post-irradiation anorexia. (From the authors' abstract)

1874

Nicolas, B. 1953

[AVIATION ACCIDENTS CONSIDERED WITH REGARD TO PSYCHOLOGICAL INJURIES: THEIR CONSEQUENCES ON THE BEHAVIOR OF CERTAIN FLYERS] Les accidents d'aviation considérés en tant que traumatismes psychiques: Leur conséquences sur le comportement de certains navigants. — Médecine aéronautique (Paris), 8 (3): 251-255. 1953. In French. DLC (TL555.M394, v. 8)

Psychological traumata are a frequent occurrence in aviators after accidents. These behavioral and emotional disturbances are ranging from severe mental cases to complex psychosomatic syndromes of ambiguous origin. Several cases are discussed to illustrate these problems. The escape of two pilots from burning planes was followed by obsessive behavior and psychomotor deficiency in one case, and by acute hallucinatory mania in the other. In another pilot, general malaise during flight (no accident was involved) was caused by a masked case of malaria, complicated by hepato-vesicular dysfunction. In keeping with the above, it is suggested that: (1) more consideration should be given in pilot selection to family histories, (2) medical treatments should be carefully chosen and supervised, and (3) the aviator's confidence in the flight surgeon should be assured.

1875

Nicolas, B., 1953a
and P. Mases

[NOTE ON VARIATIONS IN WEIGHT OBSERVED IN MILITARY PILOTS] Note sur les varations pondérales observées chez les pilotes militaires. — Médecine aéronautique (Paris), 8 (4): 335-337. 1953. In French. DLC (TL555.M394, v. 8)

Changes in weight of military pilots have been investigated. Of the 420 files analyzed, 275 referred to pilots who had been transferred from service on propeller-driven planes to jet planes. Among the various groups of pilots the following variations in weight were noted: (1) In a group of military transportation pilots and bombardiers, a slowly progressive increase in weight was noted. (2) In another group of pilots who had been transferred from propeller-driven planes to jet planes, increases in weight were observed in 52% of the cases. These increases were progressive in 60%; in 40%, transfer to jet service was followed by brusque variations in weight, while in 15% a fluctuating reaction was experienced. (3) Reduction in weight was noted in 5% of all pilots only. It is assumed that this metabolic disorder is a reaction to adaptation to stress.

1876

Niven, J. I., 1953
and A. Graybiel

POSTURAL EQUILIBRIUM IN MAN FOLLOWING UNILATERAL LABYRINTHECTOMY. — Naval School of Aviation Medicine, Pensacola, Fla. Jan. 16, 1953. 6+1 p. (Project Report no. NM 001 059.01.34). AD 8763 UNCLASSIFIED

Standing tests are not of value in discriminating unilateral malfunctioning of the otolith organs. There is no especial advantage in the use of tilted standing boards and indeed, at angles of tilt greater than 20°, effects due to loss of equilibration may be confounded with those due to the overcoming of sliding friction. Five individuals with unilateral labyrinthectomy displayed a considerable reduction in the length of time they were able to maintain a standing position on one leg with vision excluded. Average times ranged from 2.06 to 5.83 seconds with the right leg and 2.36 to 5.75 seconds with the left leg. (Authors' summary)

1877

Niven, J. I., 1953a
and A. Graybiel

RESIDUAL EFFECTS ATTRIBUTABLE TO THE SEMICIRCULAR CANALS FOLLOWING UNILATERAL LABYRINTHECTOMY IN MAN. — Naval School of Aviation Medicine, Pensacola, Fla. May 21, 1953. 8+3 p. (Project Report no. NM 001 059.01.36). AD 17 610 UNCLASSIFIED

It is known that angular acceleration is a sufficient stimulus for the semicircular canals. It has not been established so well as to whether the response of individual canals is bidirectional or unidirectional, especially in the case of man. Ewald's Law states that 'a given horizontal semicircular canal is maximally sensitive to ampullopetal flow resulting from ipsilateral rotation. In this study five unilaterally-labyrinthectomized, female subjects were exposed to clockwise and counterclockwise rotations at speeds of 1 to 10 rpm.

The duration of the oculogyral illusion and of sensations of apparent bodily rotation following cessation of rotation were used as indicants of vestibular functions. Contrary to expectation, no consistent significant differences could be found in durations following rotation in both directions. It was concluded that Ewald's Law as usually defined does not hold for man. (Authors' summary)

1878

Niven, J. I., 1953b
and A. Graybiel
DIRECTIONAL SENSITIVITY OF SEMICIRCULAR CANALS FOLLOWING UNILATERAL LABYRINTHECTOMY IN MAN. — Jour. Applied Physiol., 6 (6): 379-386. 1953. DLC (QP1.J72, v. 6)

It is known that angular acceleration is a sufficient stimulus for the semicircular canals. It has not been established so well whether the response of individual canals is bidirectional or unidirectional, especially in the case of man. Ewald's Law states that a given horizontal semicircular canal is maximally sensitive to ampullopetal flow resulting from ipsilateral rotation. In this study five unilaterally-labyrinthectomized female subjects were exposed to clockwise and counterclockwise rotations at speeds of 1-10 rpm. The duration of the oculogyral illusion and of sensations of apparent bodily rotation following cessation of rotation were used as indicants of vestibular functions. Contrary to expectation, no consistent significant differences could be found in durations following rotation in both directions. It was concluded that Ewald's Law, as usually defined, does not hold for man. (Authors' summary)

1879

Noble, C. E. 1953
SOME PHYSICAL SOURCES OF DIFFICULTY IN THE COMPLEX COORDINATION TEST CM701E. — Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-7, April 1953. vi+29 p. (Project no. 509-020-0003). AD 14 467 PB 110649

The performance of 312 airmen on the modified Complex Coordination CM701E apparatus was analyzed in respect to amplitude of response in feet, mechanical work in footpounds, and degree of crossing of the aileron and rudder controls. Aileron, elevator, and rudder controls contributed differentially to task difficulty. Absolute difficulty for crossed controls was maximal with either 0° or 10° of aileron-rudder crossing and minimal with 4°. The required response amplitude of movement was considered the primary source of task difficulty. Use of the complement slope technique improved goodness of fit and predictive precision. (AD abstract)

1880

Noble, M. E., 1953
P. M. Fitts, and E. Marlowe
THE INTERRELATIONS OF TASK VARIABLES IN CONTINUOUS PURSUIT TASKS: II. VISUAL-DISPLAY SCALE, ARM-CONTROL SCALE, AND TARGET FREQUENCY IN COMPENSATORY TRACKING. — Ohio State Univ., Columbus (Contract AF 33(038)-10528); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-55, Dec. 1953. ii+29 p. (Project no. 509-020-0009). AD 25 621 UNCLASSIFIED

The performance of skilled subjects on compensatory tracking problems was determined with respect to (1) the visual-display scale, or the amplitude of target motion in degrees of visual angle; (2) the arm control scale or the amplitude of arm movement in degrees of angular rotation at the elbow; and (3) the frequency and coherence of the target motion. The factorial design consisted of two categories of each of the variables, or 8 unique combinations of variables. Performance was measured by the root-mean-square error scores and by various time-on-target scores. Analyses of the scores indicated that tracking performance was significantly better for the lower frequency (15 cycles per minute) than for the higher frequency of problem motion. Performance was better for the larger amplitude of arm control movement (40° of arc) than for the smaller amplitude (10°). The display-scale factor failed to affect any measure of relative performance. Analyses were made of graphic records of the time patterns of control position, control acceleration, and error. (AD abstract)

1881

Noble, R. L., 1953
and N. B. G. Taylor
ANTIDIURETIC SUBSTANCES IN HUMAN URINE AFTER HAEMORRHAGE, FAINTING, DEHYDRATION, AND ACCELERATION. — Jour. Physiol. (London), 122 (2): 220-237. 1953. DLC (QP1.J75, v. 122)

The urine of human subjects, voided after venesection, fainting, and blackout due to positive acceleration, was extracted by a method employing adsorption on zinc ferrocyanide, and the extracts were tested for antidiuretic activity by the rat method of J. H. Burn (Biological Standardization, 1st ed., p. 69. London, New York, Toronto: Oxford University Press, 1937). In one phase of the experiment, human subjects were subjected to positive acceleration in a human centrifuge. Acceleration was increased to the blackout point (4.0 to 6.5 g) and then interrupted. Urine specimens were taken before and after blackout. In no case did an extract of urine voided before or after blackout cause significant antidiuresis in the test animals. These findings contrast with those obtained in subjects who had been caused to faint by venesection or following physical and psychic trauma and in whose urine an antidiuretic substance was found (ascribed to liberation of hormone from the neurohypophysis). It is concluded that the fainting and blackout are caused by basically different mechanisms.

1882

Noell, W. K. 1953
STUDIES ON THE ELECTROPHYSIOLOGY AND THE METABOLISM OF THE RETINA. — School of Aviation Medicine, Randolph Field, Tex. Oct. 1953. xi+122 p. (Project no. 21-1201-0004, Report no. 1). AD 24 537 PB 113090

Electrical and histological phenomena of the mammalian retina are studied and the effects of various poisons tested in order to determine relations between the metabolism of the retina and its function. The study is based upon the effects of intravenously administered agents (iodoacetate, sodium iodate, and sodium azide) in rabbit, cat, and monkey. These agents affect visual cells and/or pigment epithelium in a highly selective manner. They serve to analyze (1) the dependence of the visual cells upon glycolysis, (2) the pathogenesis of retinitis pigmentosa, (3) the participation of the pigment epithelium and glia in the maintenance of retinal homeostasis, (4) the localization and mechanism of generation of the electroretinogram, and (5) the organization of retinal impulse activity. (School of Aviation Medicine abstract)
Bibliography, 148 references.

1883

Noltie, H. R. 1952
A FACTOR IN POSTPONING THE ONSET OF FATIGUE. — In: Ross, S., Report on "Symposium of Fatigue" ..., p. 17-18. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

It is the purpose of this paper to determine whether a limbering-up exercise prior to a standard piece of physical exercise would decrease the accumulated oxygen debt and thus allow for an increment in working potential. The exercise devised for the experiment consisted in either running at a steady pace around a cinder track or cycling on an ordinary friction-brake ergometer at high but far from maximal rates of oxygen usage. The results were not conclusive on three subjects and suggested important individual differences. It seems possible that limbering-up may delay the onset of fatigue if that be due to oxygen lack. (Author's summary, modified)

1884

Nordmann, M., 1953
and W. Koch
[THE EFFECT OF ULTRASOUNDS ON PERIPHERAL CIRCULATION: MICROSCOPIC EXAMINATION OF TERMINAL CAPILLARY FLOW OF THE REGIO PANCREATICA IN THE RABBIT] Die Wirkung des Ultraschalls auf den peripheren Kreislauf. Mikroskopische Beobachtungen an der terminalen Strombahn der Regio Pancreatica des Kaninchens. — Zeitschrift für Kreislaufforschung (Darmstadt), 42 (11-12): 447-455. 1953. In German. DNLM

Microscopic examination of the pancreatic region was done in living rabbits following ultrasound stimulation. The sound head (3 mm. in diameter) was immersed in Tyrode's solution flowing over the extended duodenum. Sound frequencies of 1,000,000 c.p.s. and intensities of 30, 3, or 0.8 watt were applied. Results show that ultrasound exposures, at 3 watts for 3 minutes, cause local hyperemia of short duration and multiple diapedetic hemorrhages, decreasing the stimulation capacity of the vascular nervous system. In the region of hyperemia, the effects of ultrasound were diminished because they are transmitted by the vascular nerves either directly or by reflexes. Weak ultrasound waves (1 to 0.8 watt) cause reflex action, only after more than 4 minutes of application; but reflexes are not summated; doses stronger than 3 watts applied for 3 minutes, induce widespread stasis and direct or indirect tissue damage, probably through tearing.

1885

Norris, E. B., 1953
and S. D. S. Spragg
PERFORMANCE ON A FOLLOWING TRACKING TASK (MODIFIED SAM TWO-HAND COORDINATION TEST) AS A FUNCTION OF THE PLANES OF OPERATION OF THE CONTROLS. — Amer. Jour. Psychol., 35 (1): 107-117. 1953. DLC (BF1.J67, v. 35)

The performance of a two-hand coordination task as a function of the planes of rotation of the controls was investigated. The School of Aviation Medicine (SAM) Two-Hand Coordination Test was modified so that each crank control could be placed so that it rotated in any one of a variety of planes. The three planes used were: (a) horizontal, (b) vertical and parallel to the frontal body plane, and (c) vertical and perpendicular to the frontal body plane. The nine resulting possible combinations of these planes necessitated nine experimental groups plus a control group. Each group (10 subjects) was given four preliminary trials to demonstrate the equality of the groups. Eight experimental trials were given, each of the nine experimental groups being assigned to one of the combinations of the planes tested and the control group having the same combination of planes as in the preliminary trials. In the experimental trials the following two conditions were found to be superior to all others: (a) with the two cranks rotating in the vertical plane parallel to the frontal body plane (Group 1), and (b) with the right crank rotating in the vertical plane perpendicular to the frontal body plane and with the left crank rotating in the vertical plane parallel to the frontal body plane (Group 4). (From the authors' summary)

1886

Norris, E. B. 1953a
PERFORMANCE OF A MOTOR TASK AS A FUNCTION OF INTERPOLATION OF VARYING LENGTHS OF REST AT DIFFERENT POINTS IN ACQUISITION. — Jour. Exper. Psychol., 45 (4): 260-264. 1953. DLC (BF1.J6, v. 45)

The present study investigated the effects on performance of a continuous, two-hand motor task

of the interposition of rests of either 2 hr. or 10 min. after 4, 16, or 28 min. of prerest practice. Length of rest was not a differential determiner of performance in terms of postrest gains. With continued practice, there was an indication that the longer rest was more beneficial than the shorter one. The point of interposition of rest affected performance significantly. In general, the shorter the prerest practice period, the greater was the gain over rest. There was no significant interaction between the length of rest and the point of interposition of rest. For all points of interposition and both lengths of rest the first postrest trial performance was superior to that of a control group that had no rest. (Author's abstract, modified)

1887

Norris, E. B., 1953b
and S. D. S. Spragg
PERFORMANCE ON A FOLLOWING TRACKING TASK (MODIFIED SAM TWO-HAND COORDINATION TEST) AS A FUNCTION OF THE RELATIONS BETWEEN DIRECTION OF ROTATION OF CONTROLS AND DIRECTION OF MOVEMENT OF DISPLAY. — Jour. Psychol., 35 (1): 119-129. 1953. DLC (BF1.J67, v. 35)

The School of Aviation Medicine (SAM) Two-Hand Coordination Test was modified so that (a) the effect of the direction of rotation of the crank on the movement of the display could be reversed, and (b) the cranks could be placed in horizontal or vertical planes. Forty-eight subjects (divided into two groups) were given four trials each. For Group I the two cranks rotated in a vertical plane, parallel to the frontal body plane, and for Group II the left crank was placed as for Group I, while the right crank rotated in a vertical plane perpendicular to the frontal body plane. The following combinations of directions of rotation were applied: (a) clockwise rotation of the left crank moved the target follower to the left, and counterclockwise rotation to the right; clockwise rotation of the right crank moved the target follower towards the subject, while counterclockwise moved it away from the subject; (b) clockwise rotation of the left crank moved the target follower to the right, and counterclockwise moved it to the left; clockwise rotation of the right crank moved the target follower away from the subject, and counterclockwise moved it toward the subject; (c) the left crank as in (b) and the right as in (a); and (d) the left crank as in (a) and the right as in (b). Experimental condition (b) was found to be superior to (a), (c) and (d), both for Group I and Group II. (From the authors' summary)

1888

North, A. J., 1952
and H. B. Leedy
DISCRIMINATION OF STIMULI HAVING TWO CRITICAL COMPONENTS WHEN ONE COMPONENT VARIES MORE FREQUENTLY THAN THE OTHER. — Jour. Exper. Psychol., 43 (6): 400-407. 1952. DLC (BF1.J6, v. 43)

The discrimination of visual stimuli (consisting of abstract forms and having two critical components, when one component varies more frequently than the other) was investigated. Nine paired associates were learned. Each stimulus had an inner and an outer component, each of which had three values. In Condition I, values of the outer component were held constant over blocks of 12 trials while the inner component varied every trial. In Condition II, this relationship was reversed. After the original learning came the test learning in which both components were varied at equal rates. The results of the test learning were consistent with the hypothesis that values of the stimulus component which had been varied most frequently in training are better discriminated than values of the component less frequently varied. The better discrimination of values of the variable than of the constant component is attributable to more differential reinforcement of the former during the original learning. Analysis of errors demonstrated that Constant Type were more frequent than Variable Type errors in the original learning, but the latter were more frequent during the test learning. The hypothesis is offered that frequently varied critical components tend to become more figural than less frequently varied components, and that stronger associations are formed with the former. (Authors' abstract, modified)

1889

North, W. C., 1952
and J. A. Wells
MODIFICATION BY PREVIOUS TRAUMA AND TEMPERATURES OF TOLERANCE TO TUMBLING SHOCK IN RATS. — Federation Proceedings, 11 (1[1]): 380. 1952. DLC (QH301.F37, v. 11)

A significant degree of protection from normally fatal trauma (700 turns) was provided by tumbling rats at 400 turns 24 hours previously. This protection was complete if the pretrauma was given 48 hours before, and absent if given 0.5, 3, or 6 hours prior to testing. Another experiment demonstrated that the amount of preliminary trauma was of importance; 100 and 200 turns 24 hours before tumbling did not confer tolerance to 700 turns, whereas 300 to 400 turns did. Tolerance thus acquired appears to persist over a period of at least 6 months. Variation in susceptibility to other types of shock with temperature change has been reported. In our studies significant protection can be conferred by heating rats at 40°C. for 4 hours prior to tumbling, although this resistance is not apparent 24 and 48 hours after heating. The mortality of rats subjected to a temperature of 40°C. for 4 hours immediately after tumbling is significantly greater than that of unheated controls. Adrenalectomized animals are more susceptible than normal rats to this type of trauma, but prolonged administration of cortisone or ACTH to intact rats failed to affect their susceptibility to tumbling. (From the authors' abstract)

1890

Nowlis, H. H., 1953
V. Nowlis, A. H. Riesen, and G. R. Wendt

CHEMICAL INFLUENCES ON BEHAVIOR. III. THE EFFECTS OF DRAMAMINE AND SCOPOLAMINE ON EMOTIONAL AND SOCIAL BEHAVIOR WITH COMPARISON DATA ON THE EFFECTS OF OTHER DRUGS. — University of Rochester. Dept. of Psychology, N. Y. Technical Report, March 21, 1953. 1+19+22 p. (Contract N6ori-126, Task Order 1). AD 13 093
PB 109787

The effects of dramamine (C) and scopolamine (A) on social behavior, emotion, and work motivation were compared with those of the drugs designated by code letters M, L, and L+G and of a placebo. The subjects were unmarried undergraduate men over 21 who were selected on the basis of academic, personality, and medical fitness. Dosages were kept constant from subject to subject for a year. A check list of 145 adjectives and a rating scale, both based on 11 categories, were employed. Small doses of commonly used drugs induced marked changes in temporary mood, feeling, and social behavior. The administration of a lactose placebo produced no significant or consistent trends with the possible exception of a decrease in task involvement. Opposite trends occurred with L+G. A and C consistently decreased elation, positive aggression, cooperation, surgency, affiliation, and task involvement and significantly increased organic symptoms and relaxation; anxiety tended to decrease. L+G increased positive aggression, task involvement, and organic symptoms, decreased anxiety, and exhibited a strong tendency to increase elation, cooperation, surgency, and affiliation. M decreased anxiety and increased relaxation and organic symptoms but lacked the positive effects of L+G without producing most of the negative effects of A+C. L alone gave the same trends as L+G in weaker form and increased elation more definitely. (AD abstract)

1891

Nystrom, C. O., 1953
R. E. Morin, and D. A. Grant
TRANSFER EFFECTS BETWEEN AUTOMATICALLY PACED AND SELF-PACED TRAINING SCHEDULES IN A PERCEPTUAL-MOTOR TASK. — Univ. of Wisconsin, Madison (Contract AF 33(038)-23294); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-66, Dec. 1953. iv+18 p. (Project no. 512-024-0001). AD 25 580
PB 124283

Subjects were given four 25-trial blocks of automatically paced (AP) or self-paced (SP) training on a perceptual-motor task that called for a rapid succession of responses to temporally discrete visual stimulus patterns with the following results: When tested for transfer under an SP condition, the AP training group performed poorer than the SP training group on the first but was better on the last three blocks of transfer test trials. The AP training group showed significantly greater improvement than the SP training group on the SP transfer test. The conventional prediction of better performance by the SP training group was, therefore, only partly supported, and possible factors underlying this result are discussed, with special regard to implications for the design of training schedules. When tested for transfer under AP conditions, the SP training group performed poorer on the first but better on the last three blocks of transfer test trials than did the AP training group. (Authors' summary)

1892

Obraztsova, G. A. 1953
[PECULIARITIES OF FUNCTIONAL DISTURBANCES DURING HYPOXIA IN ONTOGENY] Osobennosti narusheniia funktsii nervoĭ sistemy pri gipoksii v ontogeneze. — Fiziologicheskiĭ Zhurnal SSSR (Moskva-Leningrad), 39 (3): 339-345. 1953. In Russian. DLC (QP1. F57, v. 39

A study was made of functional nervous disturbances in puppies, 1 day to 2.5 months of age, at simulated altitudes up to 20,000 m. Elevation proceeded at the rate of 2000 m./min., with 4 intermittent pauses from 5 to 30 minutes. In 1- to 2-month-old puppies, 4 stages of nervous disturbances were observed during gradually decreasing atmospheric pressures: (1) a stage of increased motor activity, (2) a hypnotic stage, (3) a stage of disturbance in muscular coordination (loss of balance during motion), and (4) a convulsive stage. Characteristic for the early age of 1-13 days is the absence of some stages of nervous disturbances found in the older puppies, and higher thresholds for all nervous disorders related to hypoxia. Resistance to hypoxia is greatest in early life (1-15 days) and decreases with advancing age.

1893

O'Brien, B., 1952
and N. D. Miller
RESOLVING POWER OF THE RETINA FOR CHROMATICITY CONTRAST AND FOR LUMINANCE CONTRAST. — Jour. Optical Soc. Amer. 42 (4): 289. 1952. DLC (QC350.O6, v. 42)

Utilizing the grating-like image of a line source produced by the interference pattern of two slits of variable separation before the pupil of an observer, the retinal resolving power has been determined free of all aberrations except local irregularities in the optical system of the eye. The line or point source consists of two very narrow spectral regions of wavelength in a simple ratio such as 5 to 4 combined by a beam splitter. In this case, the third from the central diffraction maximum at the shorter wavelength coincides with the third minimum at the longer, providing a test pattern of chromaticity contrast at constant apparent luminance. Luminance contrast alone is provided by removing either wavelength. The scale of the pattern is continuously variable by varying the separation of the diffraction slits, and the pattern can be made finer than the retinal mosaic. The longitudinal chromatic aberration of the eye present when two wavelengths are used is compensated out by a symmetrical triplet designed for us by R. E. Hopkins, and the other axial aberrations are removed by the slit arrangement. Both line and point sources have been used producing

grating and multiple star patterns, respectively, upon the retina. (Authors' abstract)

1894

O'Brien, B., and N. D. Miller 1953
A STUDY OF THE MECHANISM OF VISUAL ACUITY IN THE CENTRAL RETINA. — Univ. of Rochester. Inst. of Optics, N. Y. (Contract W33(038)-ac18317); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-198, May 1953. iv + 54 p. (RDO no. 694-45). AD 23 895 PB 122206

Measurements of transverse sections of human retinas provide precise cone spacing data from center to edge of fovea. Measurements with an electric wave model confirm the mechanism concentrating and isolating light by each cone, which thus serves as an isolated receptor. Correlation of these histological data with measured acuity shows cone spacing and reciprocal acuity varying together from center to edge of the fovea. Measurements with a new ballistic flash technique of cone thresholds, of eye movements, and of double star acuity show high uniformity of thresholds among foveal cones, in disagreement with the Hecht theory. No significant effect of involuntary eye movements is found, and acuity for double stars proves substantially independent of illumination level. High and reproducible accuracy of fixation is demonstrated by a new technique utilizing local areas of tilted cones as retinal landmarks. Removal of optical aberrations by an interference method shows that retinal structure and not the optical system sets the final limit on acuity. (Authors' abstract)

1895

O'Brien, B. 1953a
A STUDY OF NIGHT MYOPIA. — Univ. of Rochester. Inst. of Optics, N. Y. (Contract W33(038)-[ac]18317); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-206, May 1953. iv + 23 p. (RDO no. 694-41). AD 19 807 PB 113006

The literature on night myopia is reviewed in some detail, and a critical evaluation of certain outstanding papers is undertaken. There is general agreement upon the effect of chromatic aberration and the Purkinje shift, but disagreement on the importance of spherical aberration and involuntary accommodation in producing the myopia. The progressive influence of spherical aberration combined with a retina which loses resolution with diminishing illumination is considered, and appears to explain myopia at the lower limits of rod vision. Two sets of experiments are described in which vision is restricted to cone vision thus eliminating the Purkinje shift. In one set both natural and ring aperture pupils distinguish between spherical aberration and involuntary accommodation. In the other a ballistic flash technique prevents any accommodation after the test target is displayed. It is concluded that both spherical aberration and involuntary accommodation are significant in night myopia as ordinarily observed. (Author's abstract).

1896

O'Calloghan, J. 1953
BIG CYPRESS. — Med. Technicians Bull., 4: 213-219. Nov.-Dec., 1953. DNLM

The story behind a rescue mission by paramedics (medical technicians trained for parachute rescue of grounded fliers) in the Big Cypress Swamp in Florida is given. The various training phases preparing the para-medics to do their job effectively are outlined.

1897

Ochsner, A. 1952
EFFECTS OF PULMONARY BLOOD FLOW AND DISTENTION ON THE CAPACITY OF INTRAPULMONARY VESSELS. — Amer. Jour. Physiol., 168 (1): 200-207. 1952. DLC (QP1. A5, v. 168)

Changes in pulmonary vascular capacity produced by altering pulmonary blood flow and by positive and negative pressure inflation were evaluated by simultaneous quantitative registration of the internal and external volumes of a long lobe placed in an oncometer. In all states of constant inflation there is a greater increment of intrapulmonary blood for an equivalent increase in flow when blood flow is low than when it is high. In comparison with a deflated lung, equivalent increases in blood flow cause more accumulation of blood when the lung is inflated by positive pressure and allow less accumulation when distended by negative pressure around them. The current opinion was confirmed that progressive lung inflation by negative pressure – blood flow remaining constant – augments the intrapulmonary vascular capacity. The prevailing concept that positive pressure inflation on the contrary reduces pulmonary vascular capacity was supported in 3 cases only, and in these inflation by positive pressures less than 40 or 50 mm. H_2O resulted in a slight increase in blood retention. In 6 other experiments progressive lung inflation by positive pressures up to 130 mm. H_2O was accompanied by a steady increase in pulmonary vascular volume. (From the author's summary)

1898

Odinets, P. I. 1953
[A METHOD EMPLOYING CONDITIONED REFLEXES FOR THE STUDY OF THE VESTIBULAR APPARATUS] Metodika uslovnykh refleksov dlia issledovaniia vestibuliarnogo apparata. — Fiziologicheskiĭ zhurnal SSSR (Moskva & Leningrad), 39 (3): 367-373. 1953. In Russian. DNLM

An experimental method of studying the functions of the vestibular analysor by means of conditioned reflexes is described. The experimental animal is isolated from secondary stimulation in a chamber which rotates smoothly. Conditioned salivation in response to rotation is established on the basis of 0.6% hydrochloric acid (washed off by

water). The rotation can be accelerated evenly, kept at a given velocity for a determined time without variation, and then decelerated smoothly. The conditioned stimulus is adequate to activate the analysor under investigation at the lower level of threshold sensitivity of the vestibular apparatus. Throughout the experiment, time respiraton, rotation, and conditioned and unconditioned reflexes are recorded on the kymograph. Experiments were carried out on dogs, with rotations of 3-8° per second. A conditioned reflex was established to cessation of rotation, which shows that this method is applicable to the study of vestibular reactions.

1899

Office of the Surgeon General (Air Force) 1953
FIRST REPORT OF THE USAF MEDICAL SERVICE: JULY 1, 1949-JUNE 30, 1952. — xv+287 p. Washington, D. C. 1953.
DLC (UG633.A37715)

The report outlines the organization of the various offices, divisions, and units of the medical services in the U. S. Air Force. It lists training programs for medical personnel and problems involved in the selection and classification of flying personnel. Policymaking functions concerning the duties and responsibilities of flight surgeons have been assigned to the Aviation Medicine Division. This division issues directives governing the scope of physiological training and research programs and is responsible for the publication of the U. S. Air Force Medical Services Digest. — A section of the report outlines evacuation procedures for the Military Air Transport Service. Some aeromedical problems associated with commands in the Far East, Alaska, and Europe are mentioned. Statistics on health of the Air Force from July 1, 1949 to Dec. 31, 1951 are given.

1900

Ogilvie, J. C. 1953
ULTRAVIOLET RADIATION AND VISION. — A. M. A. Arch. Ophthalmol., 50 (6): 748-763. 1953. DLC (RE1.A62, v. 50)

The effects of ultraviolet radiation (300 to 400 mμ) on visual functions are discussed. In youth, the human eye is reported to be sensitive to wave lengths down to 300 mμ, but the limit of the visible spectrum is higher in old age, owing to the increased absorption of the lens. Differences in lens absorption also lead to wide individual differences in sensitivity to ultraviolet radiation, but there are no data for the absorption of the human eye in the ultraviolet region of the spectrum. It has been claimed that exposure to ultraviolet radiation will impair dark adaptation, but the weight of the evidence is against this view. Wave lengths above 305 mμ have no abiotic effect; consequently, any changes in the threshold would seem to be due to the light adaptation of the eye. Under the action of ultraviolet rays, the lens will fluoresce strongly, and the intensity of the fluo. scence increases with age. Little or nothing is known of the effect of fluorescence on visual function. There is disagreement about the color sensation produced by ultraviolet radiation, but in most cases it is stated to be blue or blue-violet. (Author's summary)

1901

Ogle, K. N. 1953
PRECISION AND VALIDITY OF STEREOSCOPIC DEPTH PERCEPTION FROM DOUBLE IMAGES. — Jour. Optical Soc. Amer., 43 (10): 906-913. 1953. DLC (QC350.O6, v. 43)

This study reports data on the question as to how precise is stereoscopic depth localization with double images and what is the relationship between that subjective depth and objective depth. Instrumentation was used which permitted a test object to be adjusted relative to a reference object, when both of these were observed in increasing disparity between the images of the two eyes and in increasing peripheral angle. The data show that the precision of the stereoscopic depth seems to decrease exponentially with disparity, becoming very small near the limiting values of disparity for stereopsis. When the test object is adjusted for half the depth of the reference object, and adjusted to be as far in front of the fixation point as the reference is behind, the data show a remarkable validity for a wide range of disparity, until the limiting disparities are approached. Then the stereoscopic depth levels off to a constant value. These results are discussed in relation to the visual processes and spatial localization. (Author's abstract)

1902

(Ohio State Univ.) 1953
STUDIES IN EXPLOSIVE DECOMPRESSION: PHYSIOLOGICAL AND PATHOLOGICAL EFFECTS. — Edited by F. Hitchcock. Ohio State Univ. Lab. of Aviation Physiology and Medicine, Columbus (Contract W33(038)ac-14478); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. xvi+228 p. (RDO no. 696-77). AD 27 765(a-x)
UNCLASSIFIED

This report consists of 24 individual papers, some of which are reprints of articles which had been published in journals; others are unpublished papers. The following papers have been abstracted separately:

Burch, B. H., 1953
Edelmann, A., 1953, 1953a
Frank, G. B., 1953
Frye, S. A., 1953
Fusco, M. M., 1953
Hitchcock, F. A., 1953a
Kemph, J. P., 1953, 1953a 1953b, 1953c, 1953d, 1953e
Rosenbaum, D. A., 1953
Stacy, R. W., 1953
Vail, E. G., 1953, 1953a, 1953b
Whitehorn, W. V., 1953, 1953a, 1953b, 1953c, 1953d

1903

(Operations Research Off.) 1953

FATIGUE AND STRESS SYMPOSIUM, 24-26 JANUARY 1952, AT OPERATIONS RESEARCH OFFICE, CHEVY CHASE, MARYLAND. — Johns Hopkins Univ. Operations Research Office, Chevy Chase, Md. Technical Memorandum no. ORO-T-185, Jan. 1953. viii+139 p. AD 4843 UNCLASSIFIED

A 9-man panel discussed available techniques for measuring and evaluating fatigue and stress. Consideration was given to a direct observance of combat fatigue and an attempt to set up a series of tests as a basis for a research program aimed at solving the fatigue and stress problems. (AD abstract, modified)

The following section of the symposium has been abstracted separately: McFarland, R. A., 1953.

1904

Orahovats, P. D., and W. S. Root 1953

THE EFFECT OF TOTAL SYMPATHECTOMY UPON RED CELL AND HEMOGLOBIN PRODUCTION IN THE HEMORRHAGED DOG. — Columbia Univ. College of Physicians and Surgeons, New York (Contract AF 33(038)25899); issued by School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+4 p. (Project no. 21-2301-0005, Report no. 2). AD 19 652 UNCLASSIFIED

The rate of red cell and hemoglobin formation was studied in 6 normal and 6 totally sympathectomized dogs during prolonged and relatively constant hemorrhagic anemia. Hemorrhaged sympathectomized dogs produce red blood cells and hemoglobin at approximately the same rates as do normal animals. The sympathetic nervous system is not essential for the regeneration of red blood cells and hemoglobin in the bled dog. (Authors' summary).

1905

Orahovats, P. D., and W. S. Root 1953a

EFFECT OF TOTAL SYMPATHECTOMY ON RED CELL AND HEMOGLOBIN PRODUCTION IN THE CHRONICALLY ANEMIC DOG. — Amer. Jour. Physiol., 173 (2): 324-327. 1953. DLC (QP1.A5, v. 173)

Same as the report, Orahovats, P. D., 1953.

1906

Packard, J. M., J. S. Graettinger, and A. Graybiel 1953

TEN YEAR FOLLOW-UP STUDY OF THE PHYSICAL STATUS OF 1000 AVIATORS: ANALYSIS OF THE ELECTROCARDIOGRAMS. — Naval School of Aviation Medicine, Pensacola, Fla. June 26, 1953. 13+24 p. (Project Report no. 001 057.05.03). AD 19 382 UNCLASSIFIED

Analyses were made of the electrocardiograms (ECG's) of 96% of the survivors of a group of 1000 healthy aviators whose first ECG's were analyzed in 1940 to 1942. Of the 202 men who had died since that time, only one died from heart disease. Of 703 men re-examined in 1950, only 4 had objective evidence of heart disease. Analysis of 639 ECG's obtained in 1940 indicated that (1) the mean heart rate had increased from 64 to 75 beats per minute; (2) the mean P-R interval had lengthened from 0.154 to 0.159 second; (3) the mean QRS duration changed only slightly; (4) the mean Q-T interval shortened from 0.384 to 0.361 second; (5) the QRS axis shifted to the left from 61.6° to 48.2°; and (6) the T axis moved to the left from 42.6° to 40.7°. The change in individual cases over the 10-year period was relatively slight, even for borderline cases whose 1940 ECG's were between the normal and the abnormal. (AD abstract)

1907

Packchanian, A. 1953

THE EFFECT OF SIMULATED ALTITUDE ON CERTAIN INSECTS. — Univ. of Texas, Austin (Contract AF 41(607)-43); and School of Aviation Medicine, Randolph Field, Tex. (Project no. 21-1401-0008, Report no. 2), Sept. 1953. iii+17 p. AD 25 269 UNCLASSIFIED

The survival of arthropods under simulated altitude conditions was studied to determine whether insects and other arthropods lodged on aircraft might be entering the U. S. from other countries. Mosquitoes (Aedes aegypti and Culex quinquefasciatus), houseflies (Musca domestica), kissing bugs (Triatoma gerstaeckeri), and tropical rat mites (Bdellonyssus bacoti) were exposed to low-temperature and negative-pressure conditions corresponding to various altitudes. All arthropods exposed to -15° C. and an atmospheric pressure of 429 mm. Hg were killed within 4 hours, whereas those exposed to 5°C. and a pressure of 522 mm. Hg survived and resumed normal activities. Low-temperature and low-pressure conditions just below lethal level produced permanent paralysis, notably of T. gerstaeckeri; the paralyzed insects were unable to feed on or transmit diseases to experimental animals. The exposure of M. domestica infected with Herpetomonas muscae domesticae to -15° C. for 2 hours and the exposure of T. gerstaeckeri infected with the flagellate, Trypanosoma cruzi, to -44 C. for 2 hours killed all the insects, but failed to kill the flagellates. (AD abstract)

1908

Paganelli, A. 1953

[SPORT AS A MEANS OF PSYCHO-PHYSICAL BUILDUP OF AVIATION PERSONNEL] Lo sport quale mezzo di potenziamento fisio-psichico del personale aeronavigante. — Rivista di medicina aeronautica (Roma), 16 (2): 200-205. 1953. In Italian. DLC (TL555.A1R5, v. 16)

Physical education plays an essential part in preserving high standards of health and morale among aviation personnel. Proper selection of aviation candidates is a prerequisite toward a successful physical education program. Such a program should avoid overexertion during the early stages, but become progressively more rigorous and more

demanding. After completion of the initial adjustment period appropriate sport activities should become part of the regular routine. The particular kinds of sport will vary according to national preferences; basket-ball, fencing, swimming, pistol shooting, are among those recommended by the author. The paper concludes with a brief summary of the Sport-Medical Congress, held at Zeist, Holland, in 1953.

1909

*Palladin, A. V., 1952
B. I. Khaĭkina, N. M. Polĭakova, E. E. Goncharova, and L. A. Mikhaĭlovskaĭa
[STUDY OF CARBOHYDRATE METABOLISM IN THE BRAIN DURING HYPOXEMIA] K izucheniĭu uglevodnogo obmena v golovnom mozgu pri gipoksemii. — In: Kislorodnaĭa terapiĭa i kislorodnaĭa nedostatochnost'. Kiev, 1952, p. 7-13. In Russian.

Rabbits were exposed to a simulated altitude of 7000-10,000 m. for 4-7 hours and rats to 8000 m. for 4 hours. Results showed an increase in lactic acid and some decrease in glycolysis in the brain tissue of both kinds of animals and hexokinase activity. In the rabbits the polysaccharide content in the brain as well as the activity of phosphorylase was increased. In the rats the polysaccharides content in the brain as well as the activity of phosphorylase diminished during hypoxemia. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiĭa (Moskva), 1953 (15): 61. DNLM (ZW1. qS729)]

1910

Palladin, A. V. 1952a
[BRAIN METABOLISM UNDER VARIOUS FUNCTIONAL CONDITIONS] Obmen veshchestv v golovnom mozgu pri razlichnykh funktsional'nykh sostoĭaniĭakh. — Vestnik Akadamii Nauk SSSR, 1952 (10): 37-62. In Russian. DNLM

A decrease of oxygen in the brain induces a disturbance in the function of the brain and in its carbohydrate metabolism. Changes in preformed lactic acid and glycogen contents (free or combined) were determined in rabbits and rats under hypoxic conditions (7,000 to 10,000 m. simulated altitude), as well as the activity of hexokinase, phosphorylase, and amylase. In rabbits, the disturbance in the carbohydrate metabolism under hypoxia was manifested chiefly in an increase in preformed lactic acid, probably due to a decrease in aerobial oxydation. The activity of glycolysis diminished, and the general glycogen content of the brain increased 60%. It is assumed that this disturbance of the normal process of glycolysis is of a non-reversible character. Hexokinase activity decreased, showing a disturbance in the glucose absorption at the very first stage. The synthetic activity of phosphorylase increased. Results in rats differed in some respects: the rate of glycolysis decreased, the glycogen content diminished 30%, and there was a decrease in the synthetic activity of phosphorylase; lactic acid did not increase. These differences are apparently due to the fact that the animals differ in their tolerance of hypoxia.

1911

Parks, R. B., 1953
E. D. Wood, and D. R. Perkins
DEVELOPMENT OF THE FLEXIBLE GUNNERY PROFICIENCY EVALUATOR. — Human Resources Research Center. Armament Systems Training Research Lab., Lowry Air Force Base, Colo. Technical Report no. 53-23, July 1953. v + 14 p. (Project no. 512-024-0001). AD 19 007 UNCLASSIFIED

This report is concerned with the design, development, and operator performance of the Flexible Gunnery Proficiency Evaluator, a new flexible gunnery research apparatus. Design of the apparatus permits unusual realism in the task of framing and tracking while providing maximum control and manipulability of task components. A scaled stimulus aircraft is moved through (arbitrarily) selected courses of considerable variability in azimuth, elevation, and range. The stimulus is tracked by use of the General Electric Pedestal Sight. Speeds ranging from the barely perceptible to those of simulated jet combat attacks may be obtained. Scoring of performance is accomplished either by electric timers or graphic recorders, or both. With respect to subject performance, the time-in-error pattern for 30 airmen naive to the task included (a) greater lag than lead in azimuth, (b) more time above than below in elevation, and (c) greater time in over-ranging than in under-ranging. Subjects were found to have the most difficulty in framing with considerably less difficulty in tracking. (From the authors' summary)

1912

Parrack, H. O. 1952b
EVALUATING EFFECTS OF INDUSTRIAL NOISE ON MAN. — A. M. A. Arch. Indus. Hyg. and Occupational Med., 5 (5): 415-429. 1952. DLC (RC963. A14, v. 5)

The thresholds of the human ear are plotted as a function of frequency (in cycles per second) and sound pressure (in decibels). The "binaural pressure" curve, which indicates the pressure required for pure tones to just excite the human ears, shows that the threshold pressure varies greatly with frequency. This, however, does not apply to the "discomfort threshold" (at about 120 db.). Sensation of pain is evoked at about 140 db., and damage to the middle ear occurs at around 160 db. Materials used for noise control vary in their effectiveness according to sound frequency. As a practical application of the interdependence of frequency and sound pressure, it is recommended that measurements of industrial noise should be carried out within frequency bands not exceeding one octave each. Certain criteria have been set up for evaluating the effectiveness of protective devices used by personnel exposed to high-level industrial noise, such as the "deafness-risk criterion" stating the critical sound pressure level beyond which permanent deafness will develop, or the "voice-communication criterion" stating interference with speech.

1913

Patt, H. 1953
PROTECTIVE MECHANISMS IN IONIZING RADIATION INJURY. — Physiol. Reviews, 33 (1): 35-76. 1953. DLC (QP1. P45, v. 33)

Water molecules play an important role in radiation injuries; hydrogen atoms, hydroxyl radicals, and other ionized particles are produced depending upon the energy level of the incident radiation. Protective mechanisms, particularly in biological systems, will depend on the blocking of energy transfers from ionizing particles during and immediately after irradiation. Oxygen deprivation during X- and-gamma radiation may act by any of the following modes: (1) by inhibiting energy transfer, (2) by shifting metabolic pathways, and (3) by leading to changes in tissue pH. The effects of chemical agents under anoxic or normal conditions depend on the particular biological system and the type and duration of radiation. A review of the pertinent literature indicates that in some animals the extent of blood supply of a tissue is proportional to the extent of radiation injury. The author indicates that chemical agents which block circulation reduce oxygen tension and thereby produce a type of hypoxia which may influence the extent of radiation damage. More facts are needed to determine the dependence of radiation-sensitive organisms on oxygen. (377 References)

1914

Payne, R. B., 1953
D. R. Osier, and P. A. S. Tomlinson
THE EFFECTS OF CERTAIN MOTION-SICKNESS PREVENTIVES UPON NAVIGATOR PROFICIENCY. — School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+8 p. (Project no. 21-1601-0004, Report no. 1). AD 122 151
UNCLASSIFIED

The two experiments reported here were designed to appraise the effects of certain motion-sickness preventives upon navigation proficiency. Two questions were at issue: (a) What are the magnitudes of effect? And (b) are the effects in any sense predictable from studies based upon aptitude test methods applied to populations of volunteer basic airmen? The first experiment explored drug effects upon proficiency exhibited in a four-hour, airborne map-reading mission. The results were inconclusive, but the null hypothesis is not necessarily regarded as the best alternative. The second experiment dealt with effects upon proficiency exhibited in a three-hour celestial trainer mission. Statistically reliable adverse effects were observed. Relative rather than absolute magnitudes of effect were highly predictable from results obtained earlier with navigator aptitude test methods. Testable hypotheses concerning factors which may modify adverse drug effects are proposed. (Authors' precis)

1915

Payne, R. B., 1953a
and G. T. Hauty
THE PHARMACOLOGICAL CONTROL OF WORK OUTPUT DURING PROLONGED TASKS. — School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+11 p. (Project no. 21-1601-0004; Report no. 2). AD 16 357 PB 110486

A study was made of the effects of a motivational technique, two analeptics, and a sedative on performance of the USAF School of Aviation Medicine Multidimensional Pursuit Test. Eighty subjects were given a 40-trial preliminary training, then subjected to various treatments, and retested for 4 hours (192 trials). The analeptics, particularly Dexedrine, prevented the loss of task proficiency which was characteristic of controls and placebos. The loss of proficiency was hastened by the motion-sickness preventive benadryl-hyoscine. The indoctrination program, designed to increase the motivational level, did not significantly affect performance. (AD abstract)

1916

Payne, R. B., 1953b
and G. T. Hauty
THE EFFECTS OF MOTION-SICKNESS PREVENTIVES UPON CERTAIN PERCEPTUAL-MOTOR COMPONENTS OF THE PILOT'S TASK. — School of Aviation Medicine, Randolph Field, Tex. May 1953. iii+4 p. (Project no. 21-1601-0004, Report no. 3). AD 16 358
UNCLASSIFIED

Sixty-four subjects received preliminary training on a complicated compensatory pursuit task involving simulated aircraft instruments and controls, then continued work for four hours under conditions designed to appraise the relative effects of motion-sickness preventives which differed in protective capacity. The effects were viewed in terms of the general course of performance and the terminal levels attained. Performance was adversely affected by a mixture consisting of 0.65 mg. hyoscine hydrobromide and 50 mg. diphenhydramine hydrochloride, but was unaffected by 0.65 mg. hyoscine alone. Results are discussed in terms of aircrew effectiveness. (Authors' summary)

1917

Payne, R. B. 1953c
THE EFFECTS OF DRUGS UPON PSYCHOLOGICAL EFFICIENCY. — Jour. Aviation Med., 24 (6): 523-529. 1953. DLC (TL555. A1A4, v. 24)

The drugs, hyoscine, Dramamine, Benadryl, and Benadryl-hyoscine were tested with 134 navigators in a 3-hour celestial trainer mission, and with 43 navigators in a 4-hour airborne, map-reading mission. The adverse side effects which were produced by the 4 anti-motion sickness drugs effected the higher intellectual processes involved in navigation. Hyoscine produced the smallest adverse effect upon these processes while Dramamine, Benadryl, and Benadryl-hyoscine produced, in this order, progressively greater adverse effect. Sixty-four pilots were tested in skill of pilotry after having taken either hyoscine or benadryl-hyoscine. Hyoscine did not appreciably cause any deterioration of pilot proficiency; by contrast, a pronounced

deterioration of skill appeared after medication with Benadryl-hyoscine. No detailed procedures are described by the author.

1918

Pepler, R. D. 1953
THE EFFECTS OF CLIMATIC FACTORS ON THE PERFORMANCE OF SKILLED TASKS BY YOUNG EUROPEAN MEN LIVING IN THE TROPICS. I. A TASK OF CONTINUOUS POINTER ALIGNMENT: EXPERIMENT 1. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 153/53, Jan. 1953. 20 p. AD 22 163
UNCLASSIFIED

Young European men, who had been living in the Tropics for at least twelve months, carried out a tracking task of continuous pointer alignment, involving a moderate amount of strenuous physical work, under four controlled indoor climates. Their success in keeping the pointers aligned was less when the basic effective temperature of the climate was 84.5° F. than when it was 76.2° F. — due mainly to the tracking behavior becoming more erratic and generally less well organized. At an effective temperature of 91.2° F. their total error scores did not differ significantly from those at 84.5° F., but the nature of their performances changed. They were slower to bring the pointers into an accurate alignment and they allowed their pointer to lag more behind the display. At an effective temperature of 66° F. their performances were more efficient than at 76.2° F. — they achieved a similar and possibly a greater accuracy with less movement of their pointer. (From the author's abstract)

1919

Pepler, R. D. 1953a
THE EFFECT OF CLIMATIC FACTORS ON THE PERFORMANCE OF SKILLED TASKS BY YOUNG EUROPEAN MEN LIVING IN THE TROPICS. II. A TASK OF CONTINUOUS POINTER ALIGNMENT: EXPERIMENT 2. --- Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 154/53, Feb. 1953. 26 p. AD 22 164 UNCLASSIFIED

Thirty-two young sailors, who had been living in the Tropics for at least one year, volunteered to carry out a task of continuous pointer alignment in eight artificial indoor climates differing in temperature and humidity. A deterioration in the accuracy of their performances was observed to occur when the effective temperature was raised from 79.5° F. to 84.5° F., i.e. over a range of temperature similar to that found detrimental to performance in earlier work both at Cambridge and at Singapore. At an effective temperature of 72.5° F., that is 6° - 8° F. cooler than the average tropical ambient temperature, their performances were improved. There was some evidence that the standard of tracking with moist climates of 80% relative humidity deteriorated over a lower range of effective temperature than in the dry climates of 20% relative humidity, although the over-all effect of the difference in humidity was not significant. The Effective Temperature Scale may be regarded nevertheless as an adequate index of the stress of the several climatic factors on performance in this experiment. (Author's summary)

1920

Pepler, R. D. 1953b
THE EFFECT OF CLIMATIC FACTORS ON THE PERFORMANCE OF SKILLED TASKS BY YOUNG EUROPEAN MEN LIVING IN THE TROPICS. III. A TASK OF MORSE CODE RECEPTION. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 155/53, Feb. 1953. 20 p. AD 22 166
UNCLASSIFIED

Twelve fully trained and experienced wireless telegraphists who had been serving in the tropics for at least the past six months volunteered to receive coded messages under different indoor climates. The average numbers of errors which this group of operators made in the test climates differed when these climates were experienced in the morning and afternoon work periods. In the mornings their average numbers of errors increased significantly when the dry and wet bulb temperatures in the room were 100°/90° and 105°/95° F. from when they were 95°/85° F., while in the afternoons only their average numbers of errors in the cool climate of 80°/70/F. and in the warm climate of 100°/90° F. differed significantly from that in a climate of 90°/80° F. The reliability of these differences in group's average performances is however undermined by the significant variability in the individual operator's reactions to the climates both in the morning and afternoon work periods. In general these telegraphists were better able to maintain their efficiency in the warm climates than the operators tested previously in England who had been artificially acclimatised to working for short periods at high room temperatures. (Author's summary)

1921

Pepler, R. D. 1953c
THE EFFECT OF CLIMATIC FACTORS ON THE PERFORMANCE OF SKILLED TASKS BY YOUNG EUROPEAN MEN LIVING IN THE TROPICS: A REPORT ON THE FIRST TWO YEARS' PSYCHOLOGICAL EXPERIMENTS AT SINGAPORE. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 192/53, Feb. 1953. 8 p. AD 22 162
UNCLASSIFIED

Two experiments on pointer alignment, one on Morse code reception and two on visual vigilance are described briefly together with the main findings. The extent to which they agree with the findings from similar experiments in England is discussed and it is concluded that no basic difference exists between them. The relative humidity of the climates, the level of skill of the subjects, the difficulty of the task and the subjects' level of mo-

tivation are identified as conditions which qualify any general statements concerning the effect of climate on performance. (Author's summary)

1922

Pepler, R. D. 1953d
THE EFFECTS OF CLIMATIC FACTORS ON THE PERFORMANCE OF SKILLED TASKS BY YOUNG EUROPEAN MEN LIVING IN THE TROPICS. IV. A TASK OF PROLONGED VISUAL VIGILANCE. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 156/53, March 1953. 24 p. AD 22 161
UNCLASSIFIED

The vigilance during a prolonged visual task of 24 naval ratings who had been living in the Tropics for at least twelve months, was measured under six different indoor climates by means of the Cambridge Clock Test. At least two days and sometimes a longer period was allowed between exposures. Under these circumstances the subjects were found to be less efficient in the moderately warm climate with an effective temperature of 82° F. than in the cooler and warmer climates with effective temperatures 67° and 92° F. The experiment was repeated with a further 18 subjects but with a changed design in which the number of climates was reduced to three and experienced by each subject on three consecutive days. The performances of the subjects in the cooler and warmer climates, with effective temperatures of 67° and 92° F., were similar to those of the subjects in the first experiment. The number of signals which they missed in the moderately warm climate, with an effective temperature of 82° F. was very much reduced however. (From the author's summary)

1923

Pera, C. S. A. 1953
(A PRECURSOR OF THE AIR MEDICINE: GIOVANNI ALFONSO BORELLI) Un precursore della medicina aeronautica: Giovanni Alfonso Borelli. — Rivista di medicina aeronautica (Roma), 16 (3): 287-318. 1953. In Italian, with English, French, Spanish, and German summaries (p. 309-318).
DLC (TL555.A1R5, v. 16)

The life of the Italian scientist, Giovanni Alfonso Borelli (1608-1679), is described, and his pioneering efforts in the study of bird flight and of high altitude physiology are outlined. In his principal work, De motu animalium, Borelli continues and extends the studies undertaken by Leonardo da Vinci and formulates basic problems of flight mechanics and of aerodynamics. In the chapter on breathing, he describes his own observations during an ascent of Mount Aetna: "Among the important phenomena I noticed," he relates, "... there was the unexpected effect produced by the exceeding rarefaction of that air; in fact, while we climbed those rocks, the slightest movement caused such exhaustion that even robust young men were forced to sit down to rest and to regain strength by augmenting the frequency of respiration." Borelli may be considered the forerunner of Paul Bert and other pioneers of modern aviation physiology.

1924

Perera, C. A. 1953
MAY'S MANUAL OF THE DISEASES OF THE EYE. — 21st edition. viii+512 p., 32 plates. Baltimore, Md.: Williams and Wilkins Co., 1953.
DLC (RE46.M4)

This book is essentially designed for the student and general practitioner of medicine. A list of ocular requirements for entrance into the Army, Navy, Marine, Coast Guard, and Air services of the United States is included in the appendix (p. 486-491).

1925

Persky, H. 1953
RESPONSE TO A LIFE STRESS: EVALUATION OF SOME BIOCHEMICAL INDICES. — Jour. Applied Physiol., 6 (6): 369-374. 1953.
DLC (QP1.J72, v. 6)

The blood glutathione level, the blood eosinophil content, and the urinary output of hippuric acid following the administration of sodium benzoate were selected as three indices of stress response and followed over a period of time in a group of airborne trainees. Specific training situations were taken as representations of focal, psychological stresses. These focal stresses resulted in a significant diminution in the blood eosinophil and glutathione levels but did not affect the synthesis of hippuric acid. The glutathione response was least subject to inter-individual and intra-individual factors, the eosinophil response being the opposite. Eosinophils and glutathione changed at about the same speed in response to the stress. These findings are taken to indicate that airborne training focal stresses are of intermediate severity on a scale whose poles are fear of failure and fear of bodily injury. As a result of this study, several criteria for the selection of stress indices are derived. (Author's summary)

1926

Peskin, J. C. 1953
DISTRIBUTION OF VISUAL THRESHOLD. — Jour. Applied Physiol., 6 (3): 177-184. 1953.
DLC (QP1.J72, v. 6)

Comparison of 170 white and 80 Negro subjects showed no significant differences in the course of dark adaptation. Rod and cone thresholds are very nearly identical in the 2 groups. Rod thresholds are asymmetrically distributed over a range of 2.2 log units. Cone thresholds are symmetrically distributed over a range of 2.8 log units. Threshold differences were found between different age groups and occupational groups.

1927

Peskin, J. C. 1953a
EFFECTS OF VITAMIN A ON VISUAL THRESHOLD. — Jour. Applied Physiol., 6 (6): 375-378. 1953.
DLC (QP1.J72, v. 6)

From a large group tested for visual thresholds, 60 subjects were chosen whose thresholds fell within the normal ranges of threshold distribution. The subjects were divided into two groups. Twenty served as controls and 40 received 50,000 IU vitamin A concentrate daily. During the subsequent period the subjects returned at 4-6 day intervals for redetermination of threshold. The results of the experiment led to the conclusion that administration of vitamin A to individuals with normal visual thresholds has little affect upon the majority of subjects. A small percentage of the population who fall within the normal range of threshold variation show increase in sensitivity when administered vitamin A. (Author's summary, modified)

1928

Pesman, G. J. 1953

APPRAISAL OF HAZARDS TO HUMAN SURVIVAL IN AIRPLANE CRASH FIRES. — Lewis Flight Propulsion Lab., Cleveland, Ohio; issued by National Advisory Committee for Aeronautics, Washington, D. C. Technical Note no. 2996, Sept. 1953. 98 p. AD 16 305 PB 110903

The factors which affect the survival of human beings in airplane accidents followed by fire were studied by conducting full-scale crashes of transport- and cargo-type airplanes. Studies of burning airplane hulks supplemented the information obtained from the crash fires. The time interval during which occupants could escape from a burning airplane was determined by using the time histories of cabin temperatures and toxic gas concentrations in conjunction with data that define the environmental conditions which can be tolerated by human beings. Other hazardous factors, such as flying detached airplane parts, explosions, and crushing of the airplane structure, were also studied. (Author's summary)

1929

Peter, P. A. 1953

MODIFICATION OF THE DEPTH PERCEPTION APPARATUS. — U. S. Armed Forces Med. Jour., 4 (7): 1057-1059. 1953.
DLC (RC970.U7, v. 4)

The standard issue Depth Perception Apparatus (#3-247-500, Armed Services Catalog of Medical Material) has been modified as follows: A shadowproof 10-watt fluorescent light is suspended a short distance above the pins of visual fixation and a cover is added on top. The background surface and the inside of the roof are painted with a low-reflecting white paint. As compared to the standard apparatus, the modified version has the following advantages: (1) it is more intensely and uniformly illuminated; (2) fewer moving parts are visible to the examinee, excluding thereby elements of confusion; (3) the apparatus is more accurate because of the absence of extraneous clues to depth such as shadows, irregular light reflexes, and visualization of the tops of the pins; and (4) the apparatus is more stable.

1930

Peters, R. M., and A. Roos 1952

EFFECT OF UNILATERAL NITROGEN BREATHING UPON PULMONARY BLOOD FLOW. — Amer. Jour. Physiol., 171 (1): 250-255. 1952.
DLC (QP1. A5, v. 171)

In 11 dogs under chloralose-morphine anesthesia the chest was opened and each lung was ventilated by a separate Starling pump. Blood flow through each lung was determined by the Fick principle both during bilateral oxygen breathing and during unilateral nitrogen breathing, the other lung receiving oxygen. Vascular resistance of each lung was calculated from mean pulmonary artery pressure and blood flow. In all but three animals there occurred a reduction of 16 to 68% of the original fraction of total flow to the nitrogen lung. The maximal effect was already present after 25 minutes, and was promptly reversible on return to bilateral oxygen. Resistance in the nitrogen lung increased by factors of 1.3 to 4.5; in the oxygen lung it remained essentially unchanged. Oxygen saturation of the blood draining the nitrogen lung ranged from 10 to 50 per cent (equivalent to oxygen tensions of 8-25 mm. Hg), of the mixed arterial blood from 62 to 96 per cent. (Authors' summary)

1931

Petrov, I. R. 1952

[ADAPTATION OF THE ORGANISM TO INSUFFICIENT OXYGEN SUPPLY] Prisposoblenie organizma pri nedostatochnom snabzhenii ego kislorodom. — In his: O roli nervoi sistemy pri kislorodnom golodanii: kislorodnoe golodanie pri izmenennoi reaktivnosti organizma, p. 10-16. Leningrad: Medgiz, 1952. In Russian.
DNLM (WL100. P497o)

Adaptation of the organism to oxygen lack in the surrounding air is accomplished (1) by the "dynamic mechanisms" of the organism, i.e., the respiratory and circulatory systems, and (2) by the blood and the tissues. Hyperpnea increases pulmonary ventilation, pulmonary surface, and thoracic suction, augmenting thereby the vascular tonus, and accelerating venous blood flow and heart volume. At the onset of hypoxia during rest, the blood circulation increases in the brain and other vital organs and decreases in the muscles, skin, etc. In multiplying its erythrocyte content the blood draws first from its own reserves, then from an increased output of the bone marrow. The tissues adapt themselves to hypoxia by augmenting their oxygen absorption capacity and by altering their metabolism. Changes in vascular tonus (dilation of the vessels of the brain and heart and contraction of the peripheral vessels) are of particular importance in adaptation to anoxia. The central nervous system not only coordinates the mechanism of oxygen supply to the tissues, but possesses its own mechanism of adaptation to hypoxia. Thus, limpness and apathy are the results of cortical protective inhibition. Artificial enhancement of this inhibition by means of narcotics strengthens the resistance of the organism to hypoxia. Experimental data have shown that a decisive role in adaptation to hypoxia is played by the cortex in its coordinating function relative to the bulbar centers.

1932

Petrov, I. R. 1952a

[FUNCTIONAL DISTURBANCES DURING OXYGEN WANT] Narushenie funktsii pri kislorodnom golodanii. — In his: O roli nervoĭ sistemy pri kislorodnom golodanii: kislorodnoe golodanie pri izmenennoĭ reaktivnosti organizma, p. 16-24. Leningrad: Medgiz, 1952. In Russian.
DNLM (WL100. P497o)

Functional changes induced by oxygen want occur first in the central nervous system. At high altitudes the conditioned reflexes disappear. However, the damages to the central nervous system are reversible until death sets in. The autonomic nervous system is likewise impaired (tachycardia, dyspnea, and first increased then lowered arterial pressure). Progressive hypocapnia aggravates the hypoxic situation. Experiments in the decompression chamber have revealed inhibition of all digestive secretions (salivary, gastric, bile) and of kidney functions. Basal metabolism is first increased, then lowered. The nonprotein nitrogen and amino-nitrogen contents of the blood are increased, showing a deterioration in the deamination of amino acids. Protein metabolism and fat metabolism are decreased. The glycogen content of the liver and resynthesis of glycogen decreases, while glycogenolysis increases, augmenting the lactic acid content in the blood and tissues. There were substantial changes in temperature regulation at different degress of hypoxia; the lower the oxygen content in the inhaled air, the greater the heat loss. Heat production is proportional to heat loss when the subject is breathing air containing up to 7-8% oxygen; below this value, heat loss exceeds heat production. Intracellular respiration is sharply increased in the liver and remains so for 72 days following exposure to hypoxia, accompanied by morphological changes.

1933

Petrov, I. R. 1953
[SOME PROBLEMS OF OXYGEN WANT IN THE LIGHT OF I. P. PAVLOV'S TEACHING] Nekotorye voprosy kislorodnoĭ nedostatochnosti v svete ucheniîa I. P. Pavlova. — Arkhiv patologii (Moskva), 15 (2): 3-14. 1953. In Russian.
DNLM (W1. AR8287)

A review is presented of data established by Russian authors on changes in the reflex activities of the organism during hypoxia, adaptation to hypoxia, and treatment of hypoxia. At high altitudes (5000 m. and above) conditioned reflexes, established in dogs, were found to disappear completely, which indicates an inhibitory process in the cortical region spreading to the subcortical areas, and a general weakening of nervous motility. These phenomena are reversible. The cerebral cortex plays an important part in adaptation to hypoxia; schizophrenics have a much higher resistance to oxygen want than normal people. Experiments have shown that functional changes can be induced, if conditioned reflex stimuli are combined with low atmospheric pressure (increase in the number of erythrocytes, reticulocytes, in hemoglobin and in lactic acid, and decrease in inorganic phosphorus of the blood, dyspnea, and spasms). This demonstrates the enormous importance of the conditioned reflex mechanism in relation to the adaptative reactions of the organism. Excessive inhibitory processes in the cortical and subcortical regions at a determined state of hypoxia have been interpreted by I. P. Pavlov as protective mechanisms. Resistance to hypoxia may be increased by altitude acclimatization and by administration of carbohydrates. Oxygen therapy combined with administration of drugs (urethan and veronal) and glucose, and injection of ascorbic acid saved the lives of 70% of the experimental animals from certain death.

1934

Peyser, A. 1952
[AUDIOMETRIC FATIGUE TEST FOR THE PURPOSE OF VOCATIONAL SELECTION] Audiometrische Ermüdungstest zum Zwecke der Berufsauswahl. — Acta oto-laryngologica (Stockholm), 41 (3-4): 158-168. 1952. In German, with English summary (p. 167-168). DNLM

The importance of auditory sensitivity tests in the selection of workers in noisy environments is stressed, in order to prevent progressive and irreversible hearing losses. The construction of an experimental noise-vibration chamber is recommended, in which regulated, measurable noise frequencies and amplitudes and floor vibrations are produced. In the auditory fatigue test, the acoustic thresholds for air and bone conduction before and after sound stimulation are determined. From the data obtained the degree of vulnerability of the auditory apparatus is derived.

1935

Phoebus, C. P. 1953
THE HIGH INTENSITY NOISE PROBLEM. — U.S. Navy Med. News Letter, 21 (4): 32-36. 1953.
DNLM

With the development of new engines and power sources, the noise problem on carrier flight decks will increase. Research personnel and equipment were taken aboard a carrier to measure the noise levels encountered, to study the effects of plane noise on the hearing of flight deck personnel, to determine whether hearing losses were permanent or transient, and to estimate the probable effects of after-burner jet engine noises on personnel. The data collected indicated levels of 130 to 140 db. The need for hearing devices was found to be immediate; some flight deck personnel probably had already suffered hearing damage. The difficulty in measuring noise at its source presents the greatest problem in noise control. Various suggestions are being investigated for the alleviation of noise levels by (1) new engine construction designs, (2) noise barriers, and (3) protective ear devices. The extra-auditory effects of noise play no small role in decreasing the efficiency of flight deck personnel and should be the subject of further research.

1936

Pickering, J. E. 1953
AEROMEDICAL PROBLEMS FOR NUCLEAR-PROPELLED AIRCRAFT. — Aeronaut. Eng. Rev., 12 (4): 69-70. 1953. DLC (TL501.A326, v. 12)

With the advance of nuclear-propelled aircraft, certain engineering and medical problems are coming to the foreground. The question arises whether nuclear-propelled planes can be so designed as to prevent radiation hazards without sacrificing basic aerodynamic principles. On the basis of presently available information concerning radiation injury to humans, it is felt that personnel should not be exposed to more than 25 roentgens per mission, and should undergo a thorough physical checkup before being exposed to 200 roentgen total radiation.

1937

Pickering, J. E., and G. E. Thoma 1953a
AEROMEDICAL PROBLEMS FOR NUCLEAR PROPELLED AIRCRAFT. — Jour. Aviation Med., 24 (5): 423-424, 445. 1953. DLC (TL555.A1A4, v. 24)

The author discusses, without attempting to answer, the problems of an aeromedical nature relating to nuclear propelled aircraft. The questions posed are: (1) what is the minimum amount of radiation allowed to escape a protective shield for absolute safety; (2) is this amount of radiation greater than the human body can tolerate; (3) how often can the aircrew be exposed to this amount of radiation; (4) what are the effects of acute and intermittent exposures to ionizing radiation; (5) is there a specific psychological problem of pilot selection relative to this specific stress or hazard of radiation exposure.

1938

Picon-Reátegui, E., G. R. Fryers, N. I. Berlin, and J. H. Lawrence 1953
EFFECT OF REDUCING THE ATMOSPHERIC PRESSURE ON BODY WATER CONTENT OF RATS. — Amer. Jour. Physiol., 172 (1): 33-36. 1953. DLC (QP1.A5, v. 172)

Groups of rats were exposed to a simulated altitude of 15,000 ft. The relative humidity in the decompression chamber was maintained at 60 ± 5% and the temperature at 25 ± 2°C. Water was freely available in open dishes. Body water determinations were made using tritiated water as an isotopic diluent, and the animals were weighed prior to each determination. Control studies were carried out simultaneously on animals kept at sea level. Maximum reduction in weight was found to be reached after about 7 days of altitude exposure. Thereafter, a gradual restoration of body weight was observed, the animals nearly regaining their initial weight in about 30 days. The water deficiency reached its maximum after about 5 days of exposure, and recovery was slightly slower than that from the weight loss, being still incomplete after 30 days. A total of 14.4 cc. of water per 100 g. of body weight (or 20% of body water content) had been lost at the period of maximal water depletion.

1939

Pinegin, N. I. 1953
[SPECTRAL SENSITIVITY AND ADAPTATION OF THE HUMAN EYE] Spekral'naía chuvstvitel'nost' i adaptatsiía glaza cheloveka. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 8: 5-25. 1953. In Russian. DNLM (W1.PR5815, v. 8)

The following questions were investigated: (1) What is spectral sensitivity of the eye, qualitatively in regard to its spectral range, quantitatively, in regard to the absolute energy value of spectral threshold stimulation? And (2) what is the relationship between spectral sensitivity and eye adaptation? Experimental results have shown that the normal human eye in daylight and dusk can see the proximal ultraviolet and the proximal infrared rays. The border of sensitivity to these rays in the peripheral rod apparatus as well as in the foveal cone region lies at λ = 302 mμ. Strict experimental measurements have shown that under conditions of dark-adaptation the sensitivity of the peripheral rod apparatus to the red and infrared spectral bands extends up to λ = 900 mμ and above and is hardly inferior to that of the foveal cone apparatus. This fact is of great theoretical and practical importance. The minimal energy necessary for visual effect in the region of maximal peripheral rod sensitivity at λ = 505 mμ averages from 7 to 10 quanta. The minimal energy necessary for color perception at λ = 546 mμ, near the maximum of foveal cone sensitivity, averages from 3 to 4 quanta to each cone, under stimulation of the neighboring cones. The light-sensitivity of 3 sections of the optical analysor in the ultraviolet, in the visible red, and in the infrared spectral bands was confirmed by experiments for retinal adaptation. The author asserts to be the first to prove the fact of dark adaptation of the peripheral rod apparatus of the optical analysor for the red spectral band.

1940

Piquet, J. 1953
[AEROTITIS] Aero-otite. — Journal français d'oto-rhino-laryngologie et chirurgie maxillo-faciale (Paris), 6 (6): 581-590. 1953. In French. DNLM

The symptoms of aerotitis are described. A subject once suffering from aerotitis is liable to be affected again; therefore, a single incident of tubal stenosis should be sufficient to eliminate a candidate from an aviation school. Deviations of the nasal septum or the conchae, or sinusitis should not constitute a cause for rejection. Allergic subjects should be considered doubtful but need not be eliminated. A rest period of 3-4 weeks after having contracted aerotitis is an absolute necessity. Rapid air compression in pressurized cabins constitutes a serious hazard

for individuals suffering from barotraumatic otitis. The best treatment of aerotitis consists in elevation to the necessary altitude by plane or in the barochamber and slow descent, relief from congestion of the rhino-pharynx by inhaling of vasoconstricting vapors, and insufflation of air into the Eustachian tube as early as possible. Tympanotomy should be performed in severe cases only and should be associated with the administration of antibiotics. The best prophylaxis consists in irradiation of the tubal opening by radium or radon to destroy the lymphoid hyperplastic tissues and thereby to increase air circulation in the middle ear. Massaging of the tube should also produce good results. Desensitization with theramine should be tried in cases in which allergy seems to play an important part in the pathogenesis of aerotitis.

1941

Pisano, E. 1953

[VARIATIONS OF ANISEIKONIA IN HYPEROXIA AND ANOXIA] Comportamento dell' aniseiconia in iperossia e anossia. — Annali di ottalmologia e clinica oculistica (Parma), 79 (9): 445-448. 1953. In Italian. DNLM

The effects of hyperoxia and anoxia were studied in twenty subjects, ten of which were isoiconics and ten basic slight-degree aniso-iconics, (determined by means of a spatial iconometer). Hyperoxia and hypoxia appear to have no action whatever on the dimensions or on the shape of the retinal image. It is believed noteworthy that these negative data agree with what has already been made evident in regard to depth perception. (Author's abstract, translated)

1942

Plas, F., 1953
and J. Bourdinaud

[CHANGES IN THE ELECTROCARDIOGRAM FOLLOWING REPEATED FLIGHT IN PRESSURIZED CABINS, CABINS WITH A CONSTANT PRESSURE DIFFERENTIAL] Variations de l'électrocardiogramme consécutives à des vols repetés en cabine pressurisée, cabine à pression différentielle constante. — Médecine aeronautique (Paris), 8 (1): 5-10. 1953. In French.
DLC (TL555.M394, v. 8)

Periodic examination of about 60 aviators exposed regularly to flights in pressurized cockpits revealed the following clinical symptoms: about one-third of the subjects complained of increase in weight of about 4 kg. in three months, and 20 kg. within a year; the total lipid content of the blood increased from 5.2 g to 9.04 g per 1000 cc.; the basal metabolism rate decreased by 5-31%. In addition, subjective symptoms such as a mental lassitude, affecting primarily the memory and the sense of judgment, and tiredness of the eye and the ear were experienced. The only objective symptom noted in two cases was a transitory deficiency of the T wave in the electrocardiogram. Speculations on the pathogenesis of this "adaptation syndrome" suggest further investigation of the individual hormone levels and water metabolism, and the effects of combustion gases in the plane, of ultrasonics, and of atmospheric ionization.

1943

Plas, F., 1953a
and J. Bourdinaud

[APNEA TEST FOLLOWING FORCED EXPIRATION, CONTROLLED BY MILLIKAN'S OXYMETER: STUDY OF CARDIOVASCULAR REACTIONS DURING THE TEST] Le test d'apnée après expiration forcée, contrôlée par l'oxymètre de Millikan: étude des réactions cardio-vasculaires pendant le test. — Médecine aéronautique (Paris), 8 (1): 11-16. 1953. In French.
DLC (TL555.M394, v. 8)

Same as the paper, Plas, F., 1952a.

1944

Plas, F., 1953b
A. Missenard, and J. Bourdinaud

[PATHOLOGICAL SIGNIFICANCE OF CERTAIN DISORDERS OF THE CARDIAC RHYTHM] Valeur pathologique de certains troubles du rhythme cardiaque. — Médecine aéronautique (Paris), 8 (1): 17-21. 1953. In French.
DLC (TL555.M394, v. 8)

Arrhythmia and tachycardia are the cardiac disorders most frequently encountered by Air Surgeons at French air force recruiting stations. The pathological significance of extrasystolic arrhythmia can be easily evaluated by cardiac function tests. Anoxemia tests carried out in the decompression chamber differentiate with great exactitude between "banal" and organic (pathological) extrasystoles. The latter often manifest themselves in vertigo, dizziness, and loss of consciousness, symptoms which warrant rejection from flight training. — According to U.S. military aptitude standards, all pilot candidates who have a stable pulse rate higher than 100 in a seated position cannot be accepted for flying. This regulation eliminates from the Air Force many young men who do not have any organic cardiac impairment, who perform the test without any special effort, and whose pulse rate returns to normal within less than 3 minutes. Electrocardiograms taken during stress do not reveal any myocardiac changes. Although the 40 mm. Hg (Flack) test does not show any dysfunction of the right heart during stress, arrhythmias are sometimes detected. Altitude improves the cardiac frequency: when the pulse rate was 120 at ground level, it decreased to 100 at 3000 m. and, in a second experiment, to 118 at 5000 m. These tachycardiac symptoms are attributed to emotional factors due to a lack of neurovegetative balance.

1945

Plas, F., 1953c
L. Tabusse, and J. Bourdinaud

[REACTION OF THE LEFT HEART TO ANOXEMIA AND STRESS TESTS] Réaction du coeur gauche à l'épreuve d'anoxémie et à l'épreuve d'effort. — Médecine aéronautique (Paris), 8 (1): 27-30. 1953. In French.
DLC (TL555.M394, v. 8)

The results of the stress test are considered normal if after twenty knee bends the cardiac rhythm does not show significant changes. If marked or persistent tachycardia is noticed following exercise, or if bradycardia is apparent three minutes after the exercise is terminated, the results are considered unfavorable. — The physiology of the heart during anoxemia induced in the decompression chamber at various altitudes is analyzed. In subjects with normal cardiac rhythm or bradycardia, the pulse rate increases proportionally with altitude until Strughold's fatal zone is reached, when presyncopal bradycardia sets in suddenly. Arterial tension also increases with the altitude. The electrocardiogram taken during and after either anoxemia or stress tests reveals certain electrical phenomena with regard to the left heart. In case of normal cardiac function, the electrical axis slightly tilts towards the left before regaining its normal position; if any pathological condition prevails, a more marked tilt towards the left is noticed. Between the simulated altitudes of 3000 and 5000 m., symptoms of ischemia (similar to those preceding angina) appear; these symptoms disappear immediately following inhalation of oxygen under pressure.

1946

Plas, F., J. Curveille, and J. Bourdinaud 1953d

[CRITICAL STUDY OF THE CARDIAC FUNCTION TESTS USED IN THE PARIS CENTER FOR MEDICAL EXAMINATION OF AVIATION PERSONNEL] Étude critique des méthodes d'exploration fonctionelle cardiaque en usage au Centre d'Examen Médical du Personnel navigant de l'aviation de Paris. — Médecine aéronautique (Paris), 8 (1): 31-33. 1953. In French.
DLC (TL555.M394, v. 8)

The inadequacies of the cardiac function tests (the Martinet and the Flack tests) in use in pilot selection are discussed. The Martinet test consists of taking of the pulse and arterial tension at rest, after twenty knee bends, and three minutes after the exercise. The major deficiency of the test is that it gives only comparative results, but no information is obtained on the amount of change in the pulse level between the pulse at rest and after stress, and therefore on the systolic contractile force which varies with each heart. — The Flack endurance test measures the cardiac rhythm in the course of apnea produced by forced expiration against a pressure of 40 mm. Hg. The physiological implications of this apnea and the accompanying right ventricular hypertension are lost. It is suggested that a cardiac function test be adopted which would more adequately serve the purpose of aviation medicine. This test would comprise: (1) evaluation of the cardiac rhythm during exposure to anoxemia or stress, throwing light on the adjustment of the heart to these agents; (2) examination of the reaction of the right heart to excessive pressure in the right ventricle (Flack test) as well as in the left ventricle (stress test); and (3) evaluation of the adjustment of the coronary circulation to stress or anoxemia. All three examinations can be easily accomplished by electrocardiography.

1947

Poe, A. C. 1953

THE EFFECTIVENESS OF THE FLIGHT APTITUDE RATING BATTERY FOR THE SELECTION OF NAVAL AVIATION CADETS. — Naval School of Aviation Medicine, Pensacola, Fla. March 1, 1953. 7+33 p. (Project Report no. NM 001 057.04.03). AD 15 171 UNCLASSIFIED

Actuarial tables were prepared showing the effectiveness of the Flight Aptitude Rating Battery (FAR), the Mechanical Comprehension Test (MCT), and the Aviation Classification Test (ACT) for the selection of Naval Aviation Cadets who entered flight training during the calendar year 1950. The results demonstrated that dropped at own request (DOR) (22% of the 1950 population) and flight failure (10%) are the major causes of predictable attrition, and that ground school attrition (2%) is too low to be of major consideration. The results also indicated that the selection battery needs revision. It was determined that the MCT contributed most to the effectiveness of the selection battery by distinguishing between cadets who attrited for ground failure, flight failure, or DOR, and those who passed training. Furthermore, the results showed that in the pass training group, cadets with high MCT grades would more likely have high over-all training grades than would cadets with low MCT grades. Finally, it was shown that lowering the FAR cut off score to secure more cadets would result in both higher training costs and less proficient new Naval Aviators. It was recommended that a new FAR selection battery, consisting of the MCT, revised tests, and tests measuring other factors of flight aptitude, be validated against the major sources of attrition. (From the author's summary)

1948

Polikanina, R. I. 1952

[ON THE ROLE OF THE MEDIATOR LINK IN SODIUM AND MAGNESIUM IONTOPHORESIS ON CONE SENSITIVITY OF THE HUMAN EYE] O roli mediatornogo zvena v deĭstvii ionofareza natriia i magniia na kolbochkovuiu chuvstvitel'nost' cheloveheskogo glaza. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad) 10: 23-31. 1952. In Russian. DNLM (W1. PR5815, v. 10)

The effects of magnesium and sodium iontophoresis (at 0.45 milliamperes) on the color sensitivity of the human eye were studied before and after injection of neostigmine (proserine 0.5%, 1-2 drops) into the conjunctival sac of normal subjects, 20-25 years of age. Results showed that an increase of either cation content induces a change in eye sensitivity in response to green and red spectral rays. Sodium iontophoresis, under conditions of dark adaptation, always decreases visual sensitivity in response to green (λ = 520 mμ). Magnesium iontophoresis considerably increases visual sensitivity to this wave length. The usual effect of sodium or magnesium iontophoresis on cone sensitivity can be removed or increased by the action of substances which are active in the acetylcholine metabolism; these substances are (a) homatropine, which excludes the effects of sodium

iontophoresis on the eye (there is no change in color sensitivity in response to either green or red); and (b) proserine, which impedes the action of magnesium iontophoresis and increases that of sodium iontophoresis. It is deduced from these findings that the effects of the ions on visual cone sensitivity can be attributed partly to what has been referred to as the "mediator acetylcholine link".

1949

Polikanina, R. I. 1952a
[ANALYSIS OF THE INFLUENCE OF SOUND ON CONE SENSITIVITY OF THE NORMAL HUMAN EYE] K analizu vliîâníîa zvuka na kolbochkovuíu chustvitel'nost' normal'nogo chelovecheskogo glaza. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 10: 32-38. 1952. In Russian.
DNLM (W1. PR815, v. 10)

A study was made on 7 men, 20-28 years of age, concerning the effects of iontophoresis on the peripheral part of the visual analysor during simultaneous visual and auditory stimulation. Color sensitivity to green was measured in the dark-adapted eye followed by sound stimulation (700 c.p.s.; 80 db.) for 20 minutes, and cone sensitivity thresholds established. In 6 subjects a marked increase of cone sensitivity was observed during sound stimulation. After injection of one drop of homatropine into the conjunctival sac, no increase was observed. In a second series of experiments sodium or magnesium iontophoresis was performed at 0.45 milliamperes for 20 minutes, after 45 minutes of dark-adaptation. Results were uniform: sodium iontophoresis always lowered visual sensitivity in response to green; sound stimulation during sodium iontophoresis increased the sensitivity level as compared to pre-sound stimulation. Magnesium iontophoresis always increased visual sensitivity to green; sound stimulation during magnesium iontophoresis decreased it. The results show that the ion factor and acetylcholine metabolism play a great part in the changes of color sensitivity during peripheral stimulation (iontophoresis), as well as during centrally acting (sound) stimuli of the visual analysor.

1950

Pollack, I. 1952f
AUDITORY FLUTTER. — Amer. Jour. Psychol., 65 (4): 544-554. 1952. DLC (BF1. A5, v. 65)

The mechanism of the perception of auditory flutter [i.e. of interrupted noise whose intermittency can be perceived by the listener] was studied by determining the relationships among several psychological scales of auditory flutter. The scales were based on the following factors: (1) the just-noticeable differences for changes in the rate of interruption, or flutter frequency, of a periodically interrupted white noise; (2) direct judgments of the subjective magnitude of auditory flutter; and (3) numerical estimations of flutter-frequencies. Results indicated that (1) the differential change in flutter frequency increases as the flutter-rate increases; (2) for the lower and intermediate range of flutter frequencies, the relative differential change of these frequencies is minimum in the region of 10 seconds; (3) all just-noticeable differences for flutter discrimination are not subjectively equal but proportional to the just-noticeable differences above threshold; and (4) it is assumed that the underlying mechanism of just-noticeable differences for auditory flutter may be considered to be more like that of loudness (additive) than like that of pitch (substitutive). (From the authors' summary)

1951

Pollack, I. 1952g
COMFORTABLE LISTENING LEVELS FOR PURE TONES IN QUIET AND NOISE. — Jour. Acoust. Soc. America, 24 (2): 158-162. 1952.
DLC (QC221. A4, v. 24)

The most comfortable listening level and the range of comfortable listening levels for pure tones were determined for a group of normal (nonclinical) listeners in the quiet and against various levels of background noise. In general, the most comfortable listening (mcl) level contour has the general shape of the equal-loudness contour at intermediate loudness levels— lowest intensity at the middle frequencies and highest intensity at the lowest frequencies. The range of listening levels considered "uncomfortable" against a quiet background varies from about 20 db. at the lowest frequencies to about 35 db. at the middle frequencies. The variability of the mcl is larger at high frequencies than at low frequencies, and is about the same magnitude as the variability of heterophonic equal-loudness matches. The effect of noise is primarily to raise the lower limit of the range of comfortable listening levels and only secondarily to raise the upper limit. As a result, the range of comfortable listening levels is decreased in noise. (Author's summary)

1952

Pollack, I., 1953
J. M. Pickett, and W. H. Sumby
VOICE IDENTIFICATION OF SPEAKERS. — Jour. Acoust. Soc. America, 25 (4): 823. 1953.
DLC (QC221.A4, v. 25)

Abstract of a paper presented at the 45th Meeting of the Acoustical Society of America, held at Philadelphia, Pa., May 7 to 9, 1953:

"Whereas the ability of a listener to identify a single aspect of a sound (e.g., the frequency of a tone) is disappointingly poor, a listener's ability to identify combinations or 'patterns' of sounds (e. g., words of the language) is remarkably good. In an attempt to examine identification performance for a situation somewhat between these two extremes, the identification of a speaker's voice (in contrast to the identification of the content of his speech) was chosen. Among the factors which affect identification of a voice are: the size of the class of possible voices, the duration of the speech sample, the voicing or nonvoicing of the speech sample, the frequency range of the speech sample, and the interference of other voices presented at

the same time.... The information transmitted increases as a growth function of speech sample duration such that each additional 0.1 second duration increases the informational transmission by an average of 30% of the portion available; the growth in informational transmission with increased voice sample is about 3 times as rapid with normal voiced speech as with whispered nonvoiced speech; speaker identification is strongly resistant to low slope, high or low pass filtering. Very large individual differences among listeners are obtained in the identification of combinations of speakers. This, in conjunction with the important role of speech sample duration, suggests that there is a large range inability to encode complex stimulus patterns for quick identification."

1953

Poritzky, S. B. 1953
OBD PICTORIAL DISPLAY. — Aviation Age, 20 (1): 40-45. 1953. DLC (TL501.A8187, v. 20)

Any attempt of the human engineer to simplify the pilot's task must, of necessity, take into consideration a more efficient, simpler means of navigation than the time-consuming methods that have been used for years. One of the new devices developed for this purpose is the CAA-Sperry pictorial display, which utilizes the signal from an Omni-Bearing-Distance station (OBD) by means of an omnirange receiver and distance-measuring equipment to continuously orient a stylus (representing the plane) on an illuminated flight chart depicting the surrounding area. The orientation of the stylus is computed automatically by feeding azimuth and distance data, obtained by the omnirange receiver and the distance measuring equipment, into a portable computer, which calculates continuously the plane's changing position and presents this on the flight chart in front of the pilot.

1954

Poritzky, S. B. 1953a
PICTORIAL COMPUTOR SIMPLIFIES NAVIGATION. — Aviation Age, 20 (2): 42-46. 1953. DLC (TL501.A8187, v. 20)

In this article, the author continues his series on human engineering (cf. the paper, Poritzky, S. B., 1953) with respect to navigational aids by presenting a description of the Aero Electronics display unit for airplane navigation. This unit is essentially the same as the Sperry pictorial computer, and also uses an omnirange receiver (VOR) and distance measuring equipment (DME), which receive their information from an Omni-Bearing-Distance station (OBD). The position of the plane with regard to the surrounding terrain is pictured on an illuminated flight chart by a marker which continually plots the flight course. One outstanding feature of this display is that it can be held in the operator's lap; and, so, does not take up space on the instrument panel.

1955

Poritzky, S. B. 1953b
PICTORIAL DISPLAY USES FILM PROJECTION. — Aviation Age, 20 (3): 48-53. 1953 DLC (TL501.A8187, v. 20)

In two other articles on visual displays (cf. the papers, Poritzky, S. B., 1953, 1953a), the author has described the Sperry pictorial display and the Aero Electronics display unit, and their relation to the pilot in making easier his navigational duties. In this article, he includes a third visual navigational display developed by the Armo Company. The outstanding feature of the Armo display is that the flight chart is projected from 35-mm. film to a screen on the instrument panel, in a 10/1 magnification ratio, thus freeing the cockpit of the actual navigational computing equipment. The chart image is bright and easily read by the pilot or co-pilot. All the information regarding azimuth and distance from the Omni-Bearing-Distance station is received, computed, and presented to the pilot automatically with great speed, as is the case with the other 2 systems.

1956

Potter, S. M., and H. C. Hardy 1952
QUIETING OF THE JET ENGINE TESTING FACILITIES IN THE WILLGOOS TURBINE LABORATORY [Abstract]. — Jour. Acoust. Soc. America, 24 (1): 116. 1952. DLC (QC221.A4, v. 24)

The quieting of the Willgoos Turbine Laboratory, a jet engine development facility of the Pratt and Whitney Aircraft Company, presented very unusual acoustic design problems because there were residences within 200 feet of the proposed building. Altogether, 14 types of structures were designed to reduce various sources of noise emanating from this laboratory, including ventilation intake and exhaust ducts and atmospheric intake and exhaust systems for test cells, compressors, and exhaustors. A design goal was set at a sound level of 75 db. in the 300-600 c.p.s. band in the immediate vicinity (approximately 50 feet) of the plant. The amount of sound reduction required for this band was 50 to 75 decibels. Various quieting constructions used on the project were baffle splitters, turns in the large acoustic ducts, lined plenums, and slotted exits. Measurements showed that, in all the installations except one, the attenuations obtained were within 5 db. of those predicted before construction. The success of the project was such that none of the noisy operations inside the building could be heard at nearby residences. (Complete abstract)

1957

Poulton, E. C. 1952
PERCEPTUAL ANTICIPATION IN TRACKING WITH TWO-POINTER AND ONE-POINTER DISPLAYS. — Brit. Jour. Psychol., General Sec., 43 (3): 222-229. 1952. DLC (BF1.B7, v. 43)

This is a study of perceptual anticipation in tracking which occurs when a two-pointer testing apparatus is compared with a single-pointer device. In the first test the subject was required to

keep the two pointers in line. In the second experiment the subject had to keep the single pointer moving vertically on a fixed line. In the third experiment a specially constructed single-pointer apparatus was used which was the same size as the double pointer device. Two-pointer matching proved to be twice as accurate as one-pointer balancing when the speed of the course varied greatly. Two-pointer matching also displayed an initial advantage when a simple predictable harmonic course was tracked as opposed to a more complex harmonic course; no such initial advantage occurred with the single-pointer apparatus, although, both showed such an advantage on the predictable course after practice. More anticipation was demonstrated with the double- than with the single-pointer apparatus. Anticipation increased with practice; however, it was never complete with either the complex harmonic course or the single-pointer display. Changing the size of the apparatus did not alter the results significantly. Smoothness of response was found to be a less sensitive measure of anticipation. Because the visual field of the "stimulus" movement and the controls was better in the two-pointer apparatus, it was felt that this gave an advantage over the single-pointer apparatus.

1958

Poulton, E. C. 1953
EYE-HAND SPAN IN SIMPLE SERIAL TASKS. --- Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A. P. U. 158/53, 1953. 11 p. AD 22 169 UNCLASSIFIED

The normal range of "eye-hand span" (reaction time) was defined for a 3-choice serial task, and attempts were made to increase and reduce the span in related tasks in order to discover the factors determining its limits. The normal span was longest at slow display speeds, but was seldom as long as the time interval between display items. It could be increased temporarily by speed stress, although never as far as twice the interval between displays during accurate serial performance. When the span was increased beyond this point by instruc tions, errors increased, especially with faster speeds of performance. It is concluded that the amount of information required in order to respond is a determinant of the lower limit of the span. The amount of information to be held in store, and the rate of storing and reproducing information, are both determinants of the upper limit. (Author's summary, modified)

1959

Poulton, E. C. 1953a
MULTIPLE-CHANNEL LISTENING. — Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 163/53, 1953. 6 p. AD 22 168 UNCLASSIFIED

Selecting information from multiple sources of speech was investigated using one or more sources of intermittent communication, and one or no source of continuous communication. It was found that two synchronous calls to the subject over different loudspeakers gave far more difficulty than two overlapping calls to the subject, or two synchronous calls only one of which was for the subject. A call over a busy speaker which was followed and overlapped by an irrelevant call over a quiet speaker, was more often misheard than could be accounted for on a simple masking hypothesis. In all cases the two calls tended to be mixed up. When continuous communication over one speaker had to be followed, calls over the other(s) tended to be missed. With the temporal pattern of communication held constant, the number of speakers (two or four) over which it was presented made no difference. With the low communication densities used, the arrangement of speakers was also irrelevant. (Author's summary)

1960

Poulton, E. C. 1953b
TWO CHANNEL LISTENING. -— Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 166/53, 1953. 7p. AD 22 140 UNCLASSIFIED

Selecting information from two simultaneous sources of speech was evaluated in terms of omissions (of which the subject was generally unaware) and mishearings, which were distributed independently. When relevant information was surrounded by irrelevant on the same channel, omissions exceeded mishearings. When it was covered by simultaneous irrelevant information on the other channel, mishearings predominated. Instructions to listen to both sources (distributed attention) gave more omissions than instructions to listen to one of them (restricted attention). This in turn gave more than instructions as to when and to what to listen (directed attention). Mishearings were independent of these instructions. Placing the speakers together increased both omissions and mishearings. Similarity of relevant material to irrelevant increased omissions; it also increased false selections, especially with the speakers together. When only one or neither source presented information continuously, omissions and mishearings were reduced, and none of these differences was significant. The results are discussed in terms of inattention and physical interference. (Author's abstract)

1961

Poulton, E. C. 1953c
CONCLUSIONS ON LISTENING TO TWO OR MORE CHANNELS. -- Medical Research Council (Gt. Brit.). Applied Psychology Research Unit, Cambridge. Report no. A.P.U. 201/53, Aug. 1953. AD 22 167 UNCLASSIFIED

The reports, Poulton, E. C., 1953a and 1953b, are summarized.

1962

Powell, A. 1953
THE NOISE OF CHOKED JETS. — Jour. Acoust. Soc. America, 25 (3): 385-389. 1953. DLC(QC221.A4, v. 25)

The noise of a jet changes character after the pressure ratio exceeds the critical value appropriate to sonic exit velocity, the general roar being dominated by a loud "whistling" or "screeching". Schlieren photographs show that sound waves of ultrasonic frequency are caused by the transition of the initially laminar boundary layer to turbulence and also by this turbulence interacting with the shock waves of the flow. Larger disturbances have also been noted, involving both the jet stream and some of the air external to the jet, and these also give rise to sound waves which have been photographed: it is these which are held responsible for the audible effects. A two-dimensional study has shown the latter phenomenon to be enhanced, and it is shown how the system of disturbances is self-maintained by virtue of sound waves creating initially small disturbances at the jet exit. The directionality of the sound field has been predicted and found in agreement with experiment, and the dimensions of the motion are compatible with the suggested mechanism. The relation to edge tones is pointed out and the mechanism indicated, a photograph of this phenomenon also being shown. Finally, mention is made of how the characteristic noise of jets working above the critical pressure might be reduced, the suggested methods having been found successful in practice. (Author's summary)

1963

Preobrazhenskiĭ, V. V. 1953
[THE CONSTANT OF ACCOMMODATION TO ELECTRICAL STIMULI UNDER CONDITIONS OF 24-HOUR ADAPTATION IN DARKNESS] Konstanta akkomodatsii k elektricheskim stimulam v usloviiakh 24-chasovoĭ adaptatsii v temnote. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 8: 296-301. 1953. In Russian.
DNLM (W1. PR5815, v. 8)

Two healthy, 25-year old men, kept in darkness for 24 hours, showed the following physiological changes: (1) Light sensitivity reached its maximum during the first hour in darkness and remained practically unchanged during the following hours. (2) Electrical excitability was considerably decreased after 20 minutes of dark-adaptation and continued to decrease, especially during sleep between tests. (3) The time constant of accommodation increased considerably after the passage from light to darkness, changed little during the stay in darkness, and returned to its original value after passage from darkness to light. When the experiment was repeated at a simulated altitude of 5000 m., the time constant of accommodation changed slightly and during the first few minutes only, after which it resumed its characteristic dark-adaptation level. Thus it appears that low atmospheric pressure decreases the effect of darkness on nerve accommodation. Sleep influenced the electrical stimulation capacity, but had no substantial effect on light sensitivity and on the accommodation constant.

1964

Price, H. L., 1952
E. H. Conner, J. D. Elder, and R. D. Dripps
EFFECTS OF SODIUM THIOPENTAL ON CIRCULATORY RESPONSE TO POSITIVE PRESSURE INFLATION OF LUNG. — Jour. Applied Physiol., 4 (8): 629-635. 1952. DLC (QP1. J72, v. 4)

Inflation of the lungs with oxygen under 15 to 20 cm. of water pressure produced significantly greater arterial hypotension in subjects anesthetized with sodium thiopental than in the same subjects during consciousness. This result is attributed to a relative failure of the vasomotor response to hypotension caused by the drug sodium thiopental. The effects of this drug on the circulation in the subjects studied were tachycardia, decreased arterial mean pressure and pulse pressure, and diminished intrathoracic venous pressure.

1965

Price, H. L., 1953
and E. H. Conner
CERTAIN ASPECTS OF THE HEMODYNAMIC RESPONSE TO THE VALSALVA MANEUVER. — Jour. Applied Physiol., 5 (8): 449-456. 1953.
DLC (QP1. J72, v. 5)

Attention has been directed to the secondary increase in arterial pressure occurring during the Valsalva maneuver. This increase in arterial pressure tends to equal the increment in venous pressure produced by the maneuver, suggesting that arterial pressure follows changes in the level of intrathoracic pressure. The administration either of l-nor-epinephrine or of tetraethylammonium will abolish the secondary increase in arterial pressure, suggesting that this change occurs as the result of a reflex hemodynamic adjustment to increased intrathoracic pressure. The response is abnormal when the initial level of venous pressure is elevated. Observations made during the infusion of l-nor-epinephrine support the view that an intense peripheral vasoconstriction can greatly elevate the pulmonary blood volume in normal man. (Authors' summary)

1966

Pride, A. M. 1953
APPROACH ANGLE LIGHT AND COLLATERAL EQUIPMENT FOR HELICOPTER LANDING AREAS. — Naval Air Test Center, Patuxent River, Md. Report no. 1 (final), [Serial no.] ST33-133, Sept. 28, 1953. ii+16+31 p. (Project no. PTR AE-10010). AD 24 076 UNCLASSIFIED

An angle of approach light for helicopter landing areas was assembled and tested to determine its effectiveness in providing all necessary visual guidance to a pilot landing a helicopter under various conditions of visibility at night. The approach light as tested was found to be unsatisfactory for service use because of the following discrepancies: (1) possibility of the pilot's misinterpreting the glide path indication; (2) the limited maximum usable range of the equipment; (3) the

poor stability of the stand; and (4) the choice of color of the lights (red, amber, and blue). However, all of the above discrepancies can be corrected, and when this has been accomplished this angle of approach light will be acceptable for service use. The use of area definition lights in conjunction with the angle of approach light was found to be desirable under good visibility conditions and necessary under restricted visibility conditions. There is a need for the development of a helicopter landing area beacon that can be identified immediately from any position within its range of visibility. (Author's abstract)

1967

Pride, A. M. 1953a
NOISE LEVEL ANALYZER — Naval Air Test Center, Patuxent River, Md. Report no. 1 (Final Report), Oct. 20, 1953. ii+10+7 p. [Serial no.] ST38-147. (Project TED no. PTR-AE-6507).
AD 21 797 UNCLASSIFIED

The Scott noise-level analyzer was laboratory-tested for conformance to the military specifications for sound level measuring equipment (MIL-S-3151) and flight tested in TV-2, P2V-6, HRS-3, and helicopter-type airplanes for a total of 10 hours to determine its performance, ease of installation, handling properties and facility of operation. The analyzer gave satisfactory performance for measuring noise levels in military airplanes. It has good handling properties and is easy to install and operate in the airplanes in which it was tested. It is considered acceptable for use in noise-level tests on military airplanes; however, future instruments should be redesigned to use standard flashlight batteries in lieu of the Mallory type RM-3 batteries, and the frequency selector shaft should be more positively connected to the solenoid as well as being polarized. (Author's abstract, modified)

1968

Pryor, W. W., 1952a
G. Marks, and H. O. Sieker
EFFECTS OF INTERMITTENT POSITIVE-NEGATIVE PRESSURE BREATHING ON PULMONARY VENTILATION AND THE CARDIOVASCULAR SYSTEM [Abstract]. — Amer. Jour. Physiol., 171 (3): 758-759. 1952.
DLC (QP1. A5, v. 171)

There is considerable controversy about the advisability of using a negative pressure phase during resuscitation. To help answer some of the questions involved, experiments have been done in which the effects of intermittent positive-pressure breathing are compared with those obtained by using positive and negative pressure as supplied by the Seeler Respirator. The pulmonary ventilation, determined by pneumotachography, and the arterial pCO_2 have been used to evaluate the changes which occur in human subjects. Due to the characteristics of the respirator, the addition of a negative pressure phase to the breathing cycle caused a reduction in alveolar ventilation below that obtained with intermittent positive pressure alone. However, this reduced alveolar ventilation was accompanied by either no change or an actual fall in arterial pCO_2. This is interpreted as meaning that a negative pressure phase during the breathing cycle facilitates intra-alveolar gas mixing. It is suggested that this may be a means of lowering arterial CO_2 tension in patients with impaired ventilation as a result of chronic lung disease. Measurements of the mean peripheral and pulmonary arterial blood pressure did not reveal significant changes during prolonged intermittent positive negative pressure breathing although the pulse pressure did vary considerably during the breathing cycle. (Complete abstract)

1969

(Psycho-Acoustic Lab.) 1953
[INVESTIGATION AND STUDIES ON VOICE COMMUNICATION]. — Harvard Univ. Psycho-Acoustic Lab., Cambridge, Mass. Report no. PNM-51, May 15, 1953; Periodic Status Report no. 21, Nov. 15, 1952-May 15, 1953. 11 p. (Contract N5ori-76, Task Order 2). AD 11 333
PB 109618

The completed research which is described includes: micro-manipulator with 4 degrees of freedom; acoustic attenuation between the ears; survey of high-intensity-noise problems; review of recent mathematical theories of cochlear dynamics; effects of depth of anesthesia on the cortical response of the cat to pure-tone bursts; and wave motion in the cochlea attributable to bone conduction. Brief descriptions are also included of 16 projects in progress on the psycho- and neurophysiological aspects of hearing. The 138 publications of the Psycho-Acoustic Laboratory since 1946 are listed chronologically. (AD abstract)

1970

Public Health Service (U.S.) 1953
HANDBOOK ON SANITATION OF AIRLINES. — v+31 p., 2 charts. Washington, D. C.: U. S. Department of Health, Education, and Welfare, Public Health Service. 1953. DNLM

This handbook presents the Public Health Service's sanitary standards for the construction and operation of commercial passenger airlines. The illustrated work also includes possible plans for the construction of ground facilities. Treated in some detail are measures to be observed by employees in handling food for use during flight. One section deals with ground installations for the disposal of waste from aircraft.

1971

Punte, C. L., 1953
L. Z. Saunders, and E. H. Krackow
THE INHALATION TOXICITY OF AEROSOLS OF 90% HYDROGEN PEROXIDE. — Army Chemical Center. Chemical Corps Medical Labs., Md. Research Report no. 189, May 1953. ii+5 p. (Project no. 4-61-14-002). AD 14 030 UNCLASSIFIED

White mice were subjected to 5- to 15-minute

exposures to an aerosol atmosphere of varying concentrations produced from 90% H_2O_2. A 3.6-5.2 mg./l. concentration was sublethal, but 9.4 mg./l. resulted in death to 1 of 10 mice 6 days after the 5 min. exposure. Concentrations of 12-19 mg./l. were fatal to most of the mice within an hour of the 10- to .15 minute exposures. Subcutaneous oxygen accumulation occurred in dependent portions of the body when the aerosol droplet size was above 4 u. Exposure to low concentrations resulted in lung congestion and pulmonary irritation. Survivors of the high concentrations showed necrosis of the bronchial epithelium, and two mice developed severe corneal damage. Skin, eye, and respiratory protection is recommended for personnel handling 90% H_2O_2. (AD abstract)

1972

Rabillard, E., 1953
and M. Gagnon
[RESISTANCE TO SEVERE ANOXIA IN RATS EXPOSED TO RELATIVELY LOW TEMPERATURES] Résistance a l'anoxie aiguë chez le rat exposé à des temperatures ambiantes relativement basses. — Revue Canadienne de biologie (Montréal), 12 (3): 411-422. 1953. In French.
DLC (QH301.R47, v. 12)

Survival under conditions of severe anoxia and at various temperatures (40° to -7°C) was studied on male rats kept without food for 24 hours. The greatest resistance to anoxia occurred at a temperature of 4°C. Acclimatization to cold, administration of ascorbic acid, feeding after a period of starvation did not prolong the animals' life under severe anoxia. Shaving of the animals diminished their resistance and shifted the temperature of maximal survival toward a higher level (about 10°C).

1973

*Rabkin, E. B. 1952
[POLYCHROMATIC TABLES FOR COLOR-VISION TESTING] Polikromaticheskie tablitsy dlîa issledovaniîa tsvetooshchushcheniîa, izd. 5, 31 p., 24 tables. Moskva: Medgiz, 1952. In Russian.

The book comprises the following parts: (1) basic principles of polychromatic methods and their application; (2) classification of color-vision disturbances; (3) theoretical foundations of the method; (4) characteristics of the tables; (5) diagnosis of forms of dichromasy, abnormal trichromasy, and determination of acquired disturbances in color perception; (6) testing methods; and (7) additional instructions and 24 polychromatic tables. In the foreword to the 5th edition, the author indicates that color-vision testing has become especially important in the light of Pavlov's teaching of analysors, particularly the visual analysor. The preceding editions had to be altered and expanded to fully exhaust the diagnostic possibilities of this method and the diagnostic means of the anomaloscope, and to discuss more fully the degree of color-vision disturbances. To attain this end, 4 new tables have been included and 2 others altered. In his additional instructions, the author gives a series of practical hints regarding the use of the tables without causing chromatic fatigue. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Glaz. bolezni (Moskva), 1954 (8): 31. DNLM (ZW1.qS729)]

1974

Rabkin, E. B., 1953
and E. G. Sokolova
[ON THE INFLUENCE OF LUMINESCENT LIGHTING ON THE TEMPORARY THRESHOLD OF CHROMATIC FATIGUE] O vliîanii liîuminestsentnogo osveshcheniîa na vremennyĭ porog khromaticheskogo utomleniîa. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad, 8: 154-160. 1953. In Russian. DNLM (W1.PR5815, v. 8)

Two series of experiments were carried out on 15 healthy subjects to determine the effect of luminescent lighting on the level of relative stability in chromatic vision, using the method of determination of the thresholds of "chromatic fatigue" under conditions of preliminary adaptation to light of various spectral compositions. Results are as follows: (1) Preliminary adaptation to a screen illuminated by incandescent light has little effect on the stability of the color vision and equals the effect of ordinary rest. (2) A greater effect on the stability of color vision is observed after adaptation to luminescent "white" light, especially after exposure to luminescent "daylight". (3) This fact justifies the use of this light in the laboratory, in industry, and in the home. (4) In all the fields of activity where normal and stable chromatic vision is necessary, the establishment of screens lit by luminescent "daylight" for periodical adaptation is of advantage. The fact that yellow stimuli do not have a uniform action on the stability of chromatic vision in response to green and red requires further investigation.

1975

Rabkin, E. B. 1953a
[EXPERIMENTAL ESTABLISHMENT OF A COLOR ATLAS] Opyt sozdaniîa atlasa tsvetov. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 8: 172-176. 1953. In Russian.
DNLM (W1.PR5815, v. 8)

An atlas for color-vision testing is described, differing from other compilations of this type by the fact that it serves not only towards the recognition of colors, but also as an aid in clinical and physiological determinations of color thresholds and in such specialized investigations as determining the range of a certain type of colorimeter and assigning numerical values according to color fields. The basic arrangement of this atlas is schematically represented by a double-cone model, the horizontal axis of which is formed by a range of achromatic fields, from white to black. Each section perpendicular to this axis is a color field of even lightness, in which contrasting colors are disposed diametrically in 9 groups (45 color shades); the basic color of each group is displayed in the middle, the other shades on the right and on the left. The description of this color model is completed by 6 figures and 2 tables.

1976

Raboutet, J., 1953
and R. Lemaire
[VOLUNTARY APNEA FOLLOWING FORCED EXPIRATION] L'apnée volontaire après expiration forcée. Médecine aéronautique (Paris), 8 (1): 35-45. 1953. In French.
DLC (TL555.M394, v. 8)

Voluntary apnea tests were administered to 300 pilots. In the first series of tests the subjects were seated, and efforts were made to provide a favorable psychological atmosphere. They were asked to perform full expiration before holding the breath. Of 106 men tested 69% were able to suspend respiration between 20 and 40 seconds. — In the second series of tests, the subject first performed the vital capacity test; then the test was repeated, and when the spirometer indicated the value reached before, the subject held his breath as long as he was able to. When the individual results of both tests were plotted on a graph, a curve with two peaks resulted, indicating the existence of two groups of subjects, those that could hold their breath for only a short term and those whose duration of voluntary apnea was longer. It is suggested that candidates not being able to hold their breath for at least 20 seconds, be rejected from flying.

1977

Radford, E. P. 1953
THE ENGINEERING OF MASK RESPIRATORS FROM THE PHYSIOLOGIC POINT OF VIEW. — In: Chem. Corps Med. Labs., Conference on artificial respiration, p. 14-45; discussion, p. 46. Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19, April 1953. AD 9582. PB 109598

The efficiency of different types of respirators was tested on subjects with various combinations of total pulmonary resistance and compliance. Valve construction is discussed which would adequately control mask pressure during both inspiration and expiration. The function of a respirator in a given situation is connected to the following general assumptions: (1) The "effective respirator pressure" (the mask-pressure at which flow would equal zero) is constant during any half respiratory cycle; (2) the lungs and the chest may be considered a single resistance-compliance system (mostly in the healthy individual); and (3) the patient's resistance and compliance are linear and constant during all phases of the respiratory cycle. In considering the practical aspects of respirator design, the following recommendations are made: (1) The mask pressure should not rise above 30 to 35 cm. of water; (2) a high mean mask pressure is desirable in case of bronchospasm or pulmonary edema; (3) an "override pressure" which could be tolerated at least for a few seconds should be provided in the valve; and (4) the oral portion of the larynx should be kept patent to eliminate blocking of the upper airway. In addition, the mask should be designed so as to fit tight and it should permit the removal of salivary secretion.

1978

Rahn, H., 1953
and W. O. Fenn
THE OXYGEN-CARBON DIOXIDE DIAGRAM. --- Univ. of Rochester. School of Medicine and Dentistry, N. Y. (Contract AF 18(600)-17); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-255, Aug. 1953. viii + 43 p., 2 diagrams in pocket. (RDO no. 696-61). AD 19 805 UNCLASSIFIED

Diagrams are given showing the interrelation of the following physiological values: oxygen and carbon dioxide of the inspired air, oxygen and carbon dioxide tension of the blood, oxyhemoglobin saturation, plasma and gas exchange ratio, at sea level and altitude. (AD abstract)

1979

Rahn, H., 1953a
and H. T. Bahnson
EFFECT OF UNILATERAL HYPOXIA ON GAS EXCHANGE AND CALCULATED PULMONARY BLOOD FLOW IN EACH LUNG. — Jour. Applied Physiol., 6 (2): 105-112. 1953.
DLC (QP1.J72, v. 6)

A method has been described for separation of gas exchange of the two lungs and simultaneous measurement in each of alveolar pO_2 and pCO_2, O_2 uptake and CO_2 output. Using this method the left lung of the dog has been subjected to various mixtures of O_2 in N_2. The changes in gas exchange with unilateral hypoxia have been presented and discussed. On the basis of certain assumptions, using data obtained in these experiments and blood dissociation curves for O_2 and CO_2, the blood flow through each lung has been estimated. When the right lung is maintained on 30% O_2 and the left lung is made hypoxic there is a local vasoconstriction in the latter which varies with the degree of unilateral hypoxia. With the left lung breathing N_2, 11% of the pulmonary flow goes through this lung, in contrast to control values of 40%. If on the other hand, the right lung is maintained on air, the hypoxic left lung will constrict less for a given alveolar pO_2. (Authors' summary)

1980

Rahn, H., 1953b
H. T. Bahnson, J. F. Muxworthy, and J. M. Hagen
ADAPTATION TO HIGH ALTITUDE: CHANGES IN BREATH-HOLDING TIME. — Jour. Applied Physiol., 6 (3): 154-157. 1953.
DLC (QP1.J72, v. 6)

Changes in maximal breath-holding time after breathing air or oxygen as well as the alveolar gas concentrations were recorded in four subjects during a 7-day exposure to an altitude of 14,100 feet (4300 m.). After the initial exposure to this altitude, the breath-holding time on air as well as on oxygen was found to be gradually reduced over the

next 5-7 days. Simultaneously the CO_2 differences between the normal resting CO_2 and that obtained at the breaking point were also reduced. These changes are interpreted as indicating an increased sensitivity of the respiratory system to CO_2. The index of breath-holding time is suggested as a simple tool in evaluating respiratory adaptation to altitude. (Authors' summary)

1981

Rahn, H., 1953c
R. C. Stroud, S. M. Tenney, and J. C. Mithoefer
ADAPTATION TO HIGH ALTITUDE: RESPIRATORY RESPONSE TO CO_2 AND O_2. — Jour. Applied Physiol., 6 (3): 158-162. 1953.
DLC (QP1.J72, v. 6)

After a residence of 5-6 days on Mt. Evans, Colorado, at an altitude of 14,100 feet, CO_2 breathing and breath-holding tests with oxygen were compared with those obtained 2 weeks previously at Rochester, New York (altitude 550 feet). All the subjects demonstrated an increased sensitivity to CO_2 after adaptation to altitude. Breath-holding studies were also carried out after breathing various O_2-N_2 gas mixtures. Under these conditions of acute respiratory acidosis a definite oxygen threshold cannot be established. With adaptation to altitude this lack of a definite threshold persists. The analysis of these breath-holding tests, furthermore, suggests that no change in sensitivity of the respiratory system to O_2 has taken place. (Authors' summary)

1982

*Raĭtses, V. S., 1952
and IA. A. Krishtal'skafa
[AGE PECULIARITIES OF THE GASTRIC MOTOR-FUNCTION UNDER SEVERE HYPOXIA IN DOGS] Vozrastnye osobennosti motornoĭ funktsii zheludka pri ostroĭ gipoksii u sobak. — Medichnyĭ Zhurnal (Kiev), 22 (3): 58-62. 1952. In Ukrainian.

A roentgenological study was undertaken on puppies 1-10 weeks of age of the gastric motor functions under conditions of severe hypoxia (6.4% atmospheric oxygen content). During the first 18 days of life no changes in the gastric motor functions were observed; at the age of 4-6 weeks, a certain depression in gastric motor functions appeared -- slight decrease in gastric tonus, prolonged closing of the pylorus, considerable delay in the evacuation of gastric content. In the puppies these changes occurred only after 30 minutes of exposure to hypoxia, while in adult dogs they were observed after 5 minutes. The characteristic sharp decrease in gastric evacuation, observed in adult dogs under hypoxia appears in puppies only at the end of the second month. These facts are indicative of the increased resistance of young animals to hypoxia. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiia (Moskva), 1954 (18): 24. DNLM (ZW1.qS729)]

1983

Raitses, V. S. 1953
[ON THE MECHANISM OF THE EFFECTS OF SEVERE HYPOXIA ON THE MOTOR FUNCTION IN GASTRIC EVACUATION. PART I.] K mekhanizmu vliianiia ostroĭ gipoksii na evakuatorno-motornuiu funktsiiu zheludka. Soobshchenie I. — Voprosy fiziologii (Kiev), 6: 77-82. 1953. In Russian.
DNLM

Hypoxia was induced in dogs by having them breathe through a mask an atmospheric mixture containing 6.4-8% oxygen. The water content in the stomach was measured every 15 minutes. Results showed that severe hypoxia of short duration induced a sharp delay in the passage of water from the stomach into the duodenum. The greatest delay occurred during the first 30 minutes of hypoxia (0-8.4% of water passed, against 66-83% in controls). After return to atmospheric pressure, evacuation was restored to normal in 15-30 minutes. The animals reacted differently to hypoxia: in some the evacuation was sharply depressed, in others, completely inhibited. The start of evacuation was always greatly delayed and the gastric and intestinal tonus markedly lowered, with peristalsis shallow and slackened, 50-90% diminished). The stomach took the atypical shape of a distended sack. After resection of the splanchnic nerves and of Vieussens' ansae, a 13% acceleration in gastric evacuation was observed in all the animals as compared to the preoperative condition. This increase in evacuation capacity was stable and observed 2-3 months later. The effect of hypoxia on gastric evacuation was either removed or sharply weakened (only a 10% delay in evacuation persisted). The author concludes that the inhibiting influence of the central nervous system under hypoxia is transmitted mainly through the sympathetic fibers.

1984

Rambach, W. A., 1953
J. A. D. Cooper, and H. L. Alt
NUCLEIC ACID METABOLISM OF THE BONE MARROW AND SPLEEN IN THE RAT: THE EFFECT OF X-RAY AND THE EFFECT OF HYPOXIA. — Northwestern Univ. Medical School, Chicago, Ill. (Contract AF 33(038)-17731); issued by School of Aviation Medicine, Randolph Field, Tex. June 1953. iii + 8 p. (Project no. 21-3501-0001, Report no. 1). AD 19 620 UNCLASSIFIED

Studies have been made on the nucleic acid metabolism and morphology of the bone marrow and spleen of rats after 800 r of total body irradiation and after 30 hours of intermittent hypoxia. A morphologic method is presented for estimation of cellularity and cell distribution in the rat spleen. The decrease in desoxyribose nucleic acid and ribose nucleic acid content in the bone marrow and spleen following irradiation and the increase following hypoxia have been correlated with the change in cellularity and cell types. The radioisotopic studies were a more sensitive index of the increase in erythropoiesis than the morphologic studies. (Authors' abstract)

1985

Rambach, W. A., 1953a
H. L. Alt, and J. A. D. Cooper
NUCLEIC ACID METABOLISM OF THE BONE MARROW AND SPLEEN IN THE RAT: THE COMBINED EFFECTS OF X-RAY AND HYPOXIA. — Northwestern Univ. Medical School, Chicago, Ill. (Contract AF 33(038)-17731); issued by School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii+8 p. (Project no. 21-3501-0001, Report no. 2). AD 19 619 PB 112002

Chronic hypoxia was produced by submitting rats to 30 hours of hypoxia before a whole-body irradiation dose of 800 r. Acute hypoxia was produced in other rats by subjecting them to hypoxia during irradiation. A protective effect which was exerted by acute hypoxia on rat bone marrow and spleen resulted in a greater concentration of desoxyribose nucleic acid (DNA) phosphorus and cellularity, a more rapid synthesis of DNA, differences in the bone marrow differential count, and a less pronounced leukopenia, weight loss, and decrease in spleen size of the irradiated hypoxic rats. The chronic hypoxia did not provide the added protection. (AD abstract)

1986

Randall, W. C., 1953
C. N. Peiss, and A. B. Hertzman
AN ANALYSIS OF THE DESICCATING CAPSULE TECHNIQUE IN THE MEASUREMENT OF REGIONAL WATER LOSSES FROM THE SKIN. — St. Louis Univ. School of Medicine, Mo. (Contract AF 18(600)-96); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. AF Technical Report no. 6680, Part 14, Dec. 1953. v+15 p. (RDO no. 696-69). AD 27 887 PB 114177

The technique of measuring the evaporative and sweating rate by applying to the skin a capsule containing a desiccant, is evaluated. The ability of the desiccant employed (finely divided Al_2O_3 or so-called activated alumina) to take up water was shown to be a curvilinear function of time, but as employed in the desiccating capsule, deviations from strict linearity over the range of usage are very small. Application of the capsule to the evaporating surface does not significantly alter the curve of relatively low rates of vaporization. It fails to absorb all the water vaporized at rates above 0.30 to 0.50 mg./sq. cm./min. It is necessary, therefore, to mop excess moisture from the skin surface under the capsule with a previously tared blotter when the capsule technique is employed to measure high sweating rates. Comparison of capsular data in the estimation of the insensible perspiration, moderate, and profuse sweating with similar data determined by other accepted techniques reveals an exceptionally high degree of correlation. That is, in competent hands, this procedure is demonstrated to be simple, accurate, and reproducible in the measurement of sweating, both at the insensible and sensible levels. (Authors' abstract, modified)

1987

Ratliff, F. 1952
THE ROLE OF PHYSIOLOGICAL NYSTAGMUS IN MONOCULAR ACUITY. — Jour. Exper. Psychol., 43 (3): 163-172. 1952.
DLC (BF1.J6, v. 43)

The correlation between "physiological nystagmus" (involuntary tremor and drifting of the eye during fixation) and visual acuity was determined experimentally. Eye motions were recorded photographically by utilizing the reflections of a light beam from a mirror mounted on a contact lens, one eye being occluded. Simultaneously, monocular acuity was measured by means of test images (minute horizontal and vertical parallel bars) flashed into the subject's eye, the subject being requested to judge the position of the bars. Contrary to previous assumptions, no positive correlation between visual acuity and physiological nystagmus (neither rapid tremor nor slow drifts) could be established. While these results lend no support to the "static" theories (that acuity is simply a form of intensity discrimination by adjacent receptors), they are compatible with such a concept.

1988

Rautian, G. N. 1953
[THRESHOLDS OF COLOR-DIFFERENTIATION] Porogi tsvetorazlicheniia. — Doklady Akademii Nauk SSSR (Moskva), 92 (5): 943-946. 1953. In Russian. DLC (AS262.S3663, v. 92)

A trichromatic colorimeter was constructed for the purpose of studying color-vision. Color vision thresholds were determined in 4 subjects with normal color perception for 36 colors, the chromativity coordinates of which satisfy the condition: red + green + blue = constant. After perfect color equalization of both halves of the visual field, the color of one of the halves was gradually changed until differentiation by the subject was achieved. The differentiation thresholds for all 36 colors were determined in 6 different directions around the point of original equality, resulting in an ellipse of thresholds on the chromaticity diagram. A total of 144 determinations was made. The color differentiation thresholds determined in this form permit one to obtain correct differentiation threshold values directly on the basis of trichromatic colorimetric data.

1989

Rawlins, J. S. P. 1953
DEVELOPMENT OF A FLYING HELMET AND OF A PROTECTIVE HELMET. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 847, Aug. 1953. 19 p. AD 30 749
UNCLASSIFIED

A new protective helmet was designed which uses four layers of continuous-filament nylon with an extra layer 2-inches wide coronally across the forehead and another wedge-shaped layer extending backward over the frontal area, and with a final layer of staple weave on the outside. An inner

padding of 3/8-inches layers of medium- and soft-density polyvinyl chloride cemented together is provided for the frontal region. The harness is made of nylon tape of 1000-lb. breaking strain which has the property of stretching under tension. A flying or inner helmet is designed (Type-F) which incorporates noise-excluding capsules. A flat telephone comparing well with the Type-32 was found acceptable for use with the helmet. A smaller, lighter telephone is being investigated. A connecter will be provided which is covered with conventional braided cotton insulation and leaves the helmet at the rear. A new oxygen-mask clip is described which permits easy attachment and detechment with one hand. The helmet was subjected to wind and impact tests as well as actual service trials. Results indicated that the inner helmet was entirely satisfactory; the outer helmet was satisfactory from the point of view of shape and weight, but deficient as far as accuracy of fit was concerned. Results of study of both head sizes and helmet sizes indicated that, owing to shrinkage during casting the outer shell in manufacture, differences as great as 0.5 inch in diameter were present. (AD abstract)

1990

Rawnsley, A. I., 1952b
and J. D. Harris
STUDIES IN SHORT-DURATION AUDITORY FATIGUE: II. RECOVERY TIME. — Jour. Exper. Psychol., 43 (2): 138-142. 1952.
DLC (BF1.J6, v. 43)

Using 2 audiometers connected through a mixing network to a pair of earphones fitted with supra-aural cushions, one for the subject and one for the experimenter, 4 normally hearing subjects were tested at frequencies of 500, 3,000, and 8,000 c.p.s. The first or fatiguing tone lasted 400 msec., the second or probe tone 50 msec. The fatiguing tones were of an intensity of 10, 30, 50, or 70 decibels. The recovery time of the ear exposed to the above frequencies up to 70 decibels was 1/3 second. For weaker stimuli, recovery was quicker. It was concluded that although the ear of a test subject in this experiment suffered with a lowering of the fatigue threshold, it was able, at moderate intensities of pure sound, to adapt and become no more fatigued even when stimulated indefinitely.

1991

Redfearn, J. W. T. 1952
PRELIMINARY INVESTIGATION OF THE EFFECT OF FATIGUE ON FINGER TREMOR. — In: Ross, S., Report on "Symposium of Fatigue" ..., p. 9-10. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

Experimental work at the Army Operational Research Group on the physiology of finger tremor has demonstrated three main frequencies, at about 30 cycles, 6-10 cycles, and 2-4 cycles per second. An investigation of tremor in psychoneurotic patients and normal controls suggests that tremor in the 6-10 cycle range is increased in persons with overt tension or anxiety and also in hysterical patients showing signs of anxiety but denying any such feeling. Sleep deprivation in itself does not appear to affect tremor in any of the wave-bands. Neither does several hours of hard work of muscles other than those acting on the finger. On the other hand exercising the muscles acting on the finger markedly increases tremor especially at the low frequencies. Acute exertion largely involving remote muscles and of sufficient severity to cause a very marked rise in pulse rate brought about increased tremor in the 6-10 cycle wave-band. This may be related to the release of adrenalin, which drug has been found to increase tremor at this frequency. (From the author's summary)

1992

Redmond, R. F., 1953
L. J. Milch, and W. W. Calhoun
THE BIOCHEMISTRY OF TISSUE TRAUMA. II. THE EFFECTS OF HEPARIN ON "THE HYPERLIPOPROTEINEMIA OF LOCAL COLD INJURY. — School of Aviation Medicine, Randolph Field, Tex., March 1953. iii+3 p. (Project no. 21-1601-0017, Report no. 2). AD 11 869 PB 109678

Repository heparin was administered to adult, male albino rabbits immediately prior to and 12 hours following exposure to a standardized local cold injury. Control animals, also cold-injured, received injections of placebo on the same schedule. The expected increase of total plasma cholesterol and lipoproteins was observed. A reorientation of plasma lipoproteins, however, resulted in a decrease of the S_f 12-20 and 20-100 classes [cf. Milch, L. J., 1952], and an increase of the 5-12 class after heparin administration. In an effort to eliminate possible contribution of fluid volume shift to the concentration changes reported the ratios of plasma concentrations of $\frac{S_f\ 12\text{-}20}{S_f\ 5\text{-}12}$ and $\frac{S_f\ 20\text{-}100}{S_f\ 5\text{-}12}$ were taken. Such calculation only increased the significance levels of the findings. The ratios show convincing evidence of lipoprotein reorientation as a result of heparin administration in rabbits rendered hypercholesteremic as a result of local cold injury. (Authors' summary)

1993

Redmond, R. F., 1953a
L. J. Milch, and W. W. Calhoun
THE BIOCHEMISTRY OF TISSUE TRAUMA. III. PLASMA LIPOPROTEIN CHANGES INDUCED BY MILD LOCAL COLD INJURY. — School of Aviation Medicine, Randolph Field, Tex., May 1953. iii+3 p. (Project no. 21-1601-0017, Report no. 3). AD 11 870 PB 109679

Plasma lipid and lipoprotein levels were determined in rabbits subjected to mild local cold injury. Plasma cholesterol concentrations and the

S_f 20-100 class of lipoproteins [cf. Milch, L. J., 1952] were significantly altered, and serum lipid phosphorus showed a tendency toward higher levels. The results indicate that lipoprotein changes can result from a purely thermal effect on rabbit muscle in the absence of ice crystal formation. A possible relationship between the degree of injury and the extent of blood lipid alterations is suggested. (Authors' summary)

1994

Reed, J. B. 1952
THE SPEED AND ACCURACY OF DISCRIMINATING DIFFERENCES IN NUMBER AND TEXTURE-DENSITY. — Mount Holyoke College. Psychophysical Research Unit, South Hadley, Mass. (Contract Nonr-131-(01); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Technical Report no. SDC-131-1-3, July 1952. 26p. AD 140 735 UNCLASSIFIED

The study consisted of three experiments: Experiment I, Subitized Number [i.e., consecutive displays differing by one dot only]; Experiment II, Estimated Number; and Experiment III, Texture-Density. Subjects sorted cards for all three experiments. For each experiment, a set of card packs was used. Each pack contained two values of the particular stimulus for that experiment. The stimuli were black dots for both experiments on number, and a network of horizontal and vertical lines for the texture-density experiment. The subjects, under a speed instruction, sorted each pack into a two-compartment box. The time of sorting was recorded for each pack and was averaged for the group of subjects. The following conclusions were drawn: (1) Differences in subitized number and texture-density can be discriminated rapidly and accurately. (2) Discriminating differences in estimated number were neither rapid nor accurate. (3) As stimulus difference increases, discrimination time decreases and approaches a constant time. (4) This constant discrimination time is approximately the same for all three aspects. (5) Assuming no change in subject or experimental conditions, there is a theoretical possibility that the entire function relating discrimination time to size of stimulus difference is the same for all aspects of vision. (From the author's summary)

1995

Reed, J. D. 1953
DESIGN OF CONTROLS FOR POSITIONING A MARKER QUICKLY AND ACCURATELY. — Rutgers Univ., New Brunswick, N. J. Progress Report no. 1, Sept. 22, 1953. 3 p. (Contract AF 30(602)-573). AD 22 407 UNCLASSIFIED

The initial work was concerned with defining the problem and designing apparatus. Two types of control designs are under development. Design (A) consists of a joy stick type control and a mechanically-linked follower which reproduces the movements of the joy stick; the follower indicates its position to the operator and records the target position. The equipment permits variation in movement ratios, friction, and spring loading. Design (B), a hand-crank type designation, utilizes two handwheels to control bearing and range; control is accomplished by a rotating central shaft (bearing) which carries a traveler on a transparent arm (range). (From AD abstract)

1996

Reid, L. S., and A. J. Slivinske 1953
RATIONALE, EXPERIMENTAL METHODOLOGY AND EXPLORATORY INVESTIGATION: THE FIRST OF A SERIES OF REPORTS ON EXPERIMENTAL ANALYSIS OF COMPLEX TASK PERFORMANCE. — Univ. of Virginia, Charlottesville (Contract W33(038)-ac-21269); issued by Wright Air Development Center. Aero-Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-310, Dec. 1953. iv+29 p. (RDO no. 694-37). AD 33 355 UNCLASSIFIED

An attempt was made to design a task which would incorporate a series of general requirements derived from a number of operational situations in the Air Force, and at the same time provide the control and measurement characteristics imposed by methodological considerations. The task made possible the manipulation of such variables as: (1) task complexity; (2) temporal relations among stimuli; (3) temporal relations between stimulus and response occurrence; (4) stimulus duration; (5) sequential relations among stimuli; (6) stimulus similarity; (7) response similarity; and (8) level of operator proficiency. Total task proficiency appeared to be largely dependent on the amount of individual task demandingness of components. Twenty male undergraduate students divided into 4 groups of 5 each were used as subjects. The results afforded the basis for a descriptive schema relating to the efficiency of complex task performance and confirmed several hypotheses. (AD abstract)

1997

Rendel, D. G. A. 1953
ENGINEERING PROBLEMS OF CONDITIONING AIRCRAFT FOR HUMAN OCCUPATION AND CONTROL. — In: The biology of flying, p. 11-15. Aeronautical Research Council (Gt. Brit.). Engineering Physics Subcommittee, London. Report no. E. P. 240, May 21, 1953. AD 23 124 UNCLASSIFIED

Also published in: Advancement of Science (London), 9 (36): 383-387. 1952. DLC (Q41.B812, v. 9)

Temperature control in cabins of high-altitude, high-speed airplanes is greatly complicated by various factors: window surfaces require heating to prevent mist and ice formation, while radio and radar sets need cooling; increased speeds lead to large temperature increases making artificial refrigeration mandatory; and very little is known about the heat transfer rates in flight from and to large surfaces such as airplane fuselages. Pressurization is complicated at speeds beyond Mach 1 due to

the ram pressure in a forward-facing intake. Subjective disturbance from noises is lessened in turbo-jet planes because of decreased vibration. Objective measurements, however, do not reveal a lessening of noise intensity. The problem of visibility is complicated by the lack of a suitable transparent material which offers sufficient structural strength. A brief review of safety equipment and escape features concludes the report.

1998

Reynolds, B., and J. A. Adams 1953
PSYCHOMOTOR PERFORMANCE AS A FUNCTION OF INITIAL LEVEL OF ABILITY. --- Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-39, Oct. 1953. iv + 30 p. (Project no. 509-020-0002). AD 22 722 UNCLASSIFIED

A study was conducted to determine the relationship of psychomotor learning and individual differences. After completion of massed or distributed practice on the rotary pursuit test, 960 basic trainees were grouped according to initial level of ability. The acquisition curves of the subgroups were examined for systematic differences in performance. With the exception of slope characteristics of the first session curves, no differences were found. (AD abstract)

1999

Reynolds, B., and J. A. Adams 1953a
MOTOR PERFORMANCE AS A FUNCTION OF CLICK REINFORCEMENT. — Jour. Exper. Psychol., 45 (5): 315-320. 1953. DLC (BF1.J6, v. 45)

The rotary pursuit task was employed. Five experimental groups were differentiated on the basis of duration of continuous time on target required for presentation of a click. Intervals of .10, .20, .50, 1.0, and 2.0 sec. were used. The subjects were stratified on the basis of total score for the first five trials. These stratification trials were followed by 50 training trials in which click was delivered, 5 trials where click was absent, and 5 trials where all experimental groups received a click for each .5 sec. continuous time on target. A control group received the same number of trials without receiving click reinforcement at any time. All experimental groups were superior to the control group at all stages of practice with the .5-sec. group generally displaying the highest level of performance throughout. The failure of the experimental groups to shift to the level of the control group during the no-click period suggests that the superiority of the experimental groups can, in part, be attributed to learning rather than motivational variables. (Authors' abstract)

2000

Reynolds, B., and J. A. Adams 1953
EFFECT OF DISTRIBUTION AND SHIFT IN DISTRIBUTION OF PRACTICE WITHIN A SINGLE TRAINING SESSION. — Jour. Exper. Psychol., 46 (3): 137-145. 1953. DLC (BF1.J6, v. 46)

The Rotary Pursuit Test was used to investigate the effects of shifting from massed to distributed and from distributed to massed practice after different amounts of training. All groups were given 30 trials of 30-sec. duration. Seven initially massed experimental groups (M-D) were shifted to distributed practice after 4, 6, 8, 11, 16, 21, and 26 trials. Seven initially distributed experimental groups (D-M) were shifted to massed practice after the same number of trials. A massed control group (MC) and a distributed control group (DC) were run under their respective conditions of practice without shifting. The results were as follows: The D-M groups readily shifted to the level of Group MC, and the shift curves for all groups had the same rate. M-D Groups 4-16 readily shifted to the level of Group DC. The performance level of Group M-D-21 was below that of Group DC at the end of the acquisition series. Twenty-one prior massed trials appeared to generate decrement in the postshift distributed trials. The rate of shift curves was generally found to be independent of prior amounts of massed practice. (Authors' abstract, modified)

2001

Richard 1953
[THE TASKS OF THE COMMISSION OF AEROMEDICAL EXPERTS] Die Aufgaben der fliegerärztlichen Expertenkommission. — Vierteljahrsschrift für schweizerische Sanitätsoffiziere (Basel), 30 (1): 34-39. 1953. In German. DNLM

The history of aviation medicine in Switzerland is briefly reviewed, from the time when it was reorganized (in 1947) on the basis of experiences gained in World War II to date. Aeromedical research in Switzerland is pursuing the following objectives: (1) to explore the conditions man in flight is exposed to, particularly in military flight; (2) to analyze the physical and psychological requirements for flying and for aerial combat; (3) to study the acute and chronic injuries a pilot may be exposed to in daily life as well as during flights, and to investigate measures of prevention or reduction of such incidents; (4) to learn about situations which may necessitate the removal of a pilot from service either temporarily or permanently; (5) to investigate methods and practices of rehabilitation of pilots towards wartime service. These tasks are entrusted to a commission of specialized flight surgeons, headed by a flight surgeon in chief, who supervises the enactment of regulations and keeps the commission informed. Constant liaison with research activities abroad is maintained by subcommittees or individual members. One of the most immediate problems to be studied is that of fatigue.

2002

Richards, W. J., E. H. Shuford, and A. J. Bickle 1953
REACTION TIMES IN RESPONSE TO LIGHT

STIMULI. — Univ. of Arkansas. Ordark Research Project, Fayetteville. Technical Report no. 22, Sept. 24, 1953. 27 p. (Contract DA-23-072-ORD-472). AD 18 208 UNCLASSIFIED

A study was made of the relationship between reaction time and intensity of (1) white stimulus light and (2) chromatic stimuli. In the first study, the resulting curves drawn from median reaction time versus stimulus intensities were hyperbolic functions which were similar for all subjects and for light and dark adaptation. For the second study, the curves were essentially the same regardless of wave length. The effect of variations in the size of a white stimulus on reaction time was also studied. The effective intensity of the stimulus remained constant as stimulus size was varied in diameter from 1 12' to 45 14'. (AD abstract)

2003

Riff, J. 1953

[CONCERNING THE FLACK TEST] A propos du test de Flack. — Médecine aéronautique (Paris), 8 (2): 149-151. 1953. In French. DLC (TL555. M394, v. 8)

A modification of the Flack test (determination of changes of the pulse rate during forced expiration against a pressure of 40 mm. Hg) is discussed It is designed to relieve the administrator of the test from the combined tasks of checking the mercury level, reading the chronometer, and computing the pulse rate. A number of electrical and electronic signaling devices are connected to the apparatus, with the mercury column of the test apparatus as a conductor. Thus a circuit is closed above the 40 mm. Hg level and a light bulb lit; a second circuit is connected to an induction coil and buzzer, signaling the weakening phase of the test; and an electronically operated "intervallometer" emits a periodic (6-minute) light or gong signal, which is recorded by the physician who takes the subject's pulse for later computation of the pulse rate.

2004

Riff, J. 1953a

[FLACK TEST TYPE IV. AND VAGOTONY] Flack de type IV. et vagotonie. — Médecine aéronautique (Paris), 8 (2): 153-155. 1953. In French. DLC (TL555. M394, v. 8)

Three vagotonic fighter pilots (pressure on the eye ball [oculocardiac reflex] produced a decrease of pulse rate to 84% of the initial value) underwent the Flack test. The Flack test curve (pulse rate plotted against time) showed a characteristic bell-shaped form, indicating the sudden climb and fall of the pulse rate. However, physical exertion (20 knee bends) did not cause excessive stress, and the pulse rate fell from 152% of the initial value to 94% within 3 minutes. It is concluded that Flack test results of the type described should not be a reason for eliminating pilots from duty when the oculo-cardiac reflex reveals a case of vagotony.

2005

Riffenburgh, R. S. 1953

OCULAR FATIGUE IN THE RADAR OPERATOR. — U. S. Armed Forces Med. Jour., 4 (1): 71-72. 1953. DLC (RC970. U7, v. 4)

In working with patients from both ship and airfield radar installations, the author encountered a disproportioned number of radar operators presenting themselves with complaints of tiring and headache during or following work. A study for the causes of these symptoms lead to the following recommendations: (1) No man should have to watch the radar screen intensely for more than one half hour at one sitting. (2) A period of ocular rest should precede each sitting. (3) The habit of looking away for the duration of slightly less than one sweep, every three or four sweeps, should be taught. (4) Seating arrangements should be appropriate to secure correct posture and greater comfort. (5) Further studies should be undertaken to determine the optimum contrast level on the screen, as well as between the screen and the surroundings. And (6) the use of red goggles similar to those used by pilots for dark adaptation prior to flight might be advisable when leaving the darkened area of the radar screen and exposing the eyes to bright sunlight.

2006

Ringenbach, G. 1953

[WHAT IS ALTITUDE POLYCYTHEMIA? AERO-MEDICAL INVESTIGATIONS AND STUDIES AT THE ALPINE STATION OF THE JUNGFRAUJOCH] Qu'est-ce que la "Polyglobulie d'altitude"? Récherches de médecine aéronautique et de la station alpine du Jungfraujoch. — Sang (Paris), 24 (1): 45-51. 1953. In French. DNLM

Previous reports have suggested that polycythemia results from decreased oxygen tension. The author was not able to confirm these findings when the effects of altitudes of 4000-9000 m. on human venous blood were studied. Re-examination of the conditions of both experiments showed that the variance was probably due to (1) the method of securing blood, (2) the source of the sample, (3) the age of the individual, and (4) the length of exposure to a given altitude. --- A study of mountain sickness at the alpine station of the Jungfraujoch was undertaken to compare venous red cell counts with peripheral erythrocyte counts (ear lobe samples) in 14 individuals of different ages and living for variable amounts of time at that altitude. In two subjects staying at the alpine station for six days, the following symptoms were observed: increase in cardiac output, tachycardia, rise in arterial pressure, polypnea, and decrease in body weight; venous red blood cell count decreased while capillary cell count increased. Each of the fourteen individuals showed a higher capillary blood count than venous cell count. It appears that the difference in red cell count can be attributed to sympathicotonia. Further research into the mechanism is desirable.

2007

Rittenhouse, C. H., 1952
M. Goldstein, and D. H. Woodward
A PRELIMINARY STUDY CONCERNING THE EFFECT OF SPECIAL TRAINING IN RANGING ON PERFORMANCE OF THE TOTAL PEDESTAL SIGHT TASK. — Human Resources Research Center. [Armament Systems Training Research Lab.], Lackland Air Force Base, Tex. Research Note no. FG 52-3, July 1952. 10 p. (Project no. 512-024-0001). ATI 159 142 UNCLASSIFIED

This study was designed to explore to what extent practice on the ranging task (separated from the other component tasks) improves performance of the total pedestal sight task. Scores were recorded by means of the Pedestal Sight Manipulation Test, (cf. Apparatus Tests, p. 558-607. Ed. by A. W. Melton. Army Air Forces Aviation Psychology Program Research Reports. Report no. 4, 1947. DLC (UG633.A375, no. 4)). It was concluded that practice on the ranging task in isolation results in improved performance of the total pedestal sight task. This improvement is most clearly demonstrated in the later stages of practice on the total task. Airmen given 15 daily periods of training on the Pedestal Sight Manipulation Test, 5 periods of which were devoted to special instruction on ranging exclusively, performed at the total task at about the same level of proficiency on the 15th day as did airmen given 15 days training on the total task without special ranging instructions. In this respect, the introduction of 5 periods of special ranging practices proved no more (but not appreciably less) effective than devotion of all training periods to practice on the complete task.

2008

Rizzolo, J. 1953
IMPORTANCE AND RELATION OF PREVENTIVE MEDICINE TO AVIATION MEDICINE. — Jour. Aviation Med., 24 (5): 412-422. 1953.
DLC (TL555.A1A4, v. 24)

The chief objective in aviation medicine is to prevent disease and injury in flying personnel and flight passengers, expecially while they are at altitude, which is but one of the many aspects of the more general field of preventive medicine. The necessary interdependence of the two fields, aviation medicine and preventive medicine, is obvious; the author gives epidemiological histories to point out the fact that ground environmental sanitary hazards threaten any airborne operation. International quarantine regulations are discussed, and methods for the transport of infectious patients are described. Problems occasioned by high-velocity and high-altitude flight are enumerated. The effects of therapeutic drug administration to the aircrew are also discussed.

2009

Robinson, E. J., 1953
and J. Coules
AN EXPERIMENTAL STUDY OF THE EFFECT OF PHOTOMETRIC BRIGHTNESS ON THE JUDGMENT OF DISTANCE AND SIZE. — Boston Univ. Optical Research Lab., Mass. Technical Note no. 103, Sept. 1953. 5+45 p. (Contract AF 33(616)-432). AD 20 409 UNCLASSIFIED

The effect of brightness on judgments of size and distance under binocular and monocular conditions was investigated. An apparatus was constructed which permitted the presentation of two homogeneous discs of light to a subject. Particular attention was paid to control of the stimuli likely to influence judgments. In the size experiments, psychophysical relationships were obtained between brightness and size and the percentage of "smaller" responses. The curves clearly indicated that brightness operated systematically to make the brighter object appear larger. This relationship was evident under binocular as well as monocular conditions. It was also indicated that, as the absolute level of brightness increased, the effect of the brighter object in any particular brightness ratio decreased. In the distance experiments, the data indicated that: (1) brightness is a factor in judgments of distance under binocular and monocular conditions, and (2) under binocular conditions judgments of distance are a function of the actual distance of the objects. (Authors' abstract)

2010

Roby, T. B. 1952
THE INFLUENCE OF SUBGROUP RELATIONSHIPS ON THE PERFORMANCE OF GROUP AND SUBGROUP TASKS [Abstract]. — Amer. Psychologist, 7 (7): 313. 1952.
DLC (BF1.A55, v. 7)

Sociometric rating and ranks were correlated with various performance measures indicating the effectiveness of subgroup performance in 90 eleven-man bomber crews. The results indicate that, on an over-all basis, a high degree of personal liking is associated with superior performance of the crew as a whole. On the other hand, when attention is concentrated on certain specific task divisions within the crew, the correlations between performance scores and the sociometric ratings between crew positions most immediately concerned are chiefly negative. Further analysis shows that there may be optimal ratios relating within-subgroup to between-subgroup mean sociometric values, which optima are determined by the amount of subgroup interaction. Within this framework, sociometric ratings may be understood as indicating the motivational weights to be assigned where competition exists. (Author's abstract, condensed)

2011

Roby, T. B. 1953
PROBLEMS OF RATIONAL GROUP ASSEMBLY EXEMPLIFIED IN THE MEDIUM BOMBER CREW. — Human Resources Research Center. Combat Crew Training Research Lab., Randolph Air Force Base, Tex. Research Bulletin no. 53-18, July 1953. iii+9 p. (Project no. 511-023-0003). AD 19 461 PB 125162

The problem of group assembly is described as

it exists in the present program of training Air Force combat crews and the suggestion is made that this problem raises considerations which are almost unique in social psychological research. Specifically, it is emphasized that the goal of this research is not limited to the selection of "good" groups from a population of given size but must provide for the best utilization in groups of an entire pool. The problem is divided into two successive tasks; first, the prediction of "group scores" from measures on individuals or components; second, the specification of an optimal "assembly" of permissible groups. Finally, certain suggestions are offered as ways of cutting down the extreme combinatorial complexity of the problem. (Author's summary)

2012

Roby, T. B., and D. G. Forgays 1953a
A PROBLEM SOLVING MODEL FOR ANALYSIS OF COMMUNICATION IN B-29 CREWS. — Human Resources Research Center. Combat Crew Training Research Lab., Randolph Air Force Base, Tex. Research Bulletin no. 53-30, Aug. 1953. iii + 19 p. (Project no. 511-023-0001). AD 19 467 PB 125161

Research on small-group performance has been hampered by the complexity of relationships between predictor variables and end products of performance. This indicates the need for theoretical models to bridge the gap. Although various models exist, each containing important features, it is contended that none quite suffices. — An eclectic model dealing with the relationship between communication and group behavior was presented together with some hypotheses on group efficiency. An attempt was made to show how to surmount initial difficulties in the application of this model to the measurement situation for which it was designed, i. e., interphone communication of B-29 crews in training. Finally, a brief discussion was appended relative to the major directions which subsequent work on the model is expected to follow: empirical validation, logical formalization, and generalization of scope. (Authors' summary)

2013

Roby, T. B. 1953b
RELATIONSHIPS BETWEEN SOCIOMETRIC MEASURES AND PERFORMANCE IN MEDIUM-BOMBER CREWS. — Human Resources Research Center. Combat Crew Training Research Lab., Randolph Air Force Base, Tex. Research Bulletin no. 53-41, Nov. 1953. iii + 11 p. (Project no. 511-023-0002). AD 23 034 PB 126197

The general purpose of this study was to determine whether sociometric ratings among aircrew members relate significantly to their performance on training missions. Three levels of analysis were investigated: (a) the relationship between individual sociometric status and individual performance measures; (b) the relationship between the ratings of one member of a crew-position pair for the other and their joint coordination rating; (c) the mean intracrew sociometric rating and crew performance measures. In all cases, small but significant positive correlations are obtained. Two alternative explanations are invoked. The first attributes the positive results to consistent and specific interpersonal behaviors; the second explanation attributes the results to a generalized motivational effect. Finally, the study is seen as lending preliminary justifications to the use of personal liking measures as interim criteria for operations aimed at the rational assembly of bomber crews. (Author's summary)

2014

Rock, M. L. 1953
VISUAL PERFORMANCE AS A FUNCTION OF LOW PHOTOPIC BRIGHTNESS LEVELS. — Jour. Applied Psychol., 37 (5): 412-427. 1953. DLC (BF1.J55, v. 37)

Using 10 subjects with perfect vision, a systematic investigation of performance in visual tasks as a function of low photopic brightness levels was attempted. Four types of visual tasks were investigated: judgment of magnitude of an illusion, absolute threshold for motion, depth perception, and a simple addition task. All tasks were investigated under five brightness levels in the range of .005 foot-lamberts to 1.00 foot-lamberts. In each of the experiments, critical brightness levels were found below which performance was increasingly poor. Increased brightness above the critical level improved performance relatively little or not at all. The critical level for motion threshold was .1 foot-lamberts; for the other tasks approximately .05 foot-lamberts. It was suggested that for maximum performance on visual tasks, with minimum brightness, illumination should be adjusted to yield brightness values of .05 to .1 foot-lamberts. (From the author's summary)

2015

[Roddis, L. H., and J. L. Schwartz] 1953
THE HISTORY OF THE MEDICAL DEPARTMENT OF THE UNITED STATES NAVY IN WORLD WAR II: A NARRATIVE AND PICTORIAL VOLUME. Office of the Surgeon General (Navy) vol. 1. — xvii+380 p. Washington, D. C., 1953. DLC (D807.U6A53, v. 1)

The following papers, contained in this report, have been abstracted separately:

Adams, J. C., 1953
Carson, L. D., 1953
Jenkins, J. G., 1953
Williams, N. E., 1953
(Bureau of Medicine) 1953

2016

Rodewald, F. A., and F. F. Fintak 1953
DEVELOPMENT OF SURVIVAL EQUIPMENT PECULIAR TO AIR EVACUATION. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. 6 p. (Project no. 21-40-004, Report no. 1, Supplement). AD 22 308 PB 106828s

The use of the Mae West life jacket is described for the care and handling of air-evacuated paraplegics and patients in heavy casts when the aircraft meets with an overwater emergency. Two additional Mae Wests, placed on the legs of the cast, insure sufficient buoyancy and safety for patients wearing a heavy spica cast. Procedures are described for lifting such patients into a life raft. Precautions are recommended for boarding life rafts. Care must be taken to safeguard the fabric of the 20-man life raft from long toenails and fingernails, shoes, jewelry, and metal appurtenances. The development of a special type of jacket embodying the following features is recommended: adjustable construction, several air chambers, oral inflation valves within reach of the mouth, pockets containing auxiliary emergency equipment accessible to the patient, vertical-position support for the patient, comfortable crotch or seat, and adequate buoyancy in turbulent water. (AD abstract)

2017

Rodewald, F. A. 1953a
JUNGLE SURVIVAL AND RESCUE OF AIR EVACUATION AIRCRAFT PERSONNEL. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. 11p. (Project no. 21-40-004, Report no. 2). AD 22 238 PB 112893

Problems of survival in jungle areas were studied on a field trip to Panama in December 1952. The following conclusions were reached: Survivors of air evacuation aircraft crash must remain in vicinity of wrecked aircraft until rescued. Equipment for aircraft traveling over jungle areas should be augmented to contain food for extended period, adequate hunting equipment, heating and lighting facilities, sufficient quantities of insect repellent, and more effective signaling devices. (School of Aviation Medicine abstract)

2018

Roff, M. 1953
THE PILOT CANDIDATE SELECTION RESEARCH PROGRAM. V. A FACTORIAL STUDY OF THE MOTOR APTITUDES AREA. — Univ. of Minnesota. Inst. of Child Welfare, Minneapolis (Contract AF 41(128)-160); issued by School of Aviation Medicine, Randolph Field, Tex. March 1953. 25 p. (Project no. 21-29-008, Report no. 5). AD 7491 UNCLASSIFIED

The primary purposes of the present study have been the determination of the factorial composition of a substantial number of psychomotor tests, of the relations among these factors, and of their relations to various factors derived with printed tests. Following a set of five subanalyses of groups of tests selected from the total battery, a total analysis with 63 variables was made. Fourteen factors were extracted in the main analysis. Eight of these were defined by printed tests; these eight factors are as follows: orientation, number, memory, space, reasoning, complex perceptual speed, length perception, and perceptual closure. The other six factors of the total analysis are defined by scores from psychomotor tests and are as follows: integrated coordination, visuo-motor discrimination, anticipatory balancing reaction, eccentric pursuit, visuo-motor discrimination error, and pursuit learning. (From the author's summary and conclusions)

2019

Rogers, O. R., and R. F. Cook 1952
AERODYNAMIC NOISE AND THE ESTIMATION OF NOISE IN AIRCRAFT. — Jour. Acoust. Soc. America, 24 (4): 446. 1952. DLC (QC221.A4, v. 24)

Abstract of a paper presented at the 43rd Meeting of the Acoustical Society of America, held at New York, N. Y., May 8-10, 1952:

"Noise resulting from the flow of air over the fuselage of an airplane has been investigated and found to depend principally on approximately the fifth power of the indicated air speed. The resulting empirical relation of noise level to airspeed is found to be quite useful in estimating the noise in the frequency range above 600 c.p.s., for airplanes varying widely in size, shape, and method of propulsion. From this relation a method has also been evolved for making rough estimates of the weight of acoustical insulation necessary to reduce the noise in airplanes to a predetermined level."

2020

Roos, G. 1953
A BIBLIOGRAPHY OF MILITARY MEDICINE RELATING TO THE KOREAN CONFLICT: 1950-1953. — 22 p. Washington, D. C.: U.S. Armed Forces Medical Library, Reference Division, 1953. DLC (Z6672.M6U47)

A total of 194 references are given covering medical (including aeromedical) problems related to cold injuries, communicable diseases, dentistry, evacuation, naval medicine, psychiatry, and wounds.

2021

Roscoe, S. N. 1953
DATA PRESENTATION AND CONTROL DEVICES. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 70-74. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Modern flight requires extremely rapid and accurate responses of the pilot. A reduction of pilot error may be achieved in the future if instrument data are presented in such a manner that the direction of natural response of the pilot will correspond to the desired direction of movement of the aircraft or its controls.

2022

Rosen, M. W. 1953
A DOWN-TO-EARTH VIEW OF SPACE FLIGHT. — Jour. Brit. Interplanetary Soc., 12: 26-32. 1953. DLC (TL790.A1B7, v. 12)

Manned flight has been accomplished to an altitude of 15 miles in a Douglas Skyrocket. Feasibility of manned flight between 15 and 50 miles has been demonstrated by instruments on recovered WAC Corporal rockets and sections from Aerobees ejected by parachute from an altitude of 50 miles. Accelerations encountered in the powered ascent to this altitude are within the limits of human tolerance. Temperatures on the surface of the vehicle rising to 50 miles are within the scope of our technology. Problems encountered in long flights at this altitude, such as radiation, meteor collisions, and free fall in a vacuum, cannot be adequately explored at this time because of the short flying time of manned rockets utilizing our present capabilities. The space above 50 miles presents even greater difficulties. Attempts of parachute recovery have not been successful. Accelerations of rockets which reach the heights above 50 miles may be beyond human tolerance. Temperatures encountered under such acceleration could also be beyond our present methods of control for any occupant of the rocket. The effects of cosmic and solar radiation are very little understood above 50 miles.

2023

Rosenbaum, D. A., and F. A. Hitchcock 1953

THE EXTENT AND PROBABLE CAUSE OF CARDIOVASCULAR CHANGES DUE TO EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression, p. 153-167. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(q)

UNCLASSIFIED

Systemic blood-pressure changes following explosive decompression were quantitatively measured, and the effect of variations in the rate and range of decompression on the magnitude of these changes was determined. Explosive decompression from 10,000 to 60,000 feet (in 5000-feet increments starting at 30,000 feet) was administered to 22 dogs. The dogs were recompressed 5 seconds after decompression, and ground level was reached 1 minute after decompression. The first fall in arterial blood pressure began 1 to 2 beats after decompression. The blood pressure then leveled off at a plane below normal or rose slightly before the second fall which occurred 10-12 seconds after decompression; the second fall is attributed to anoxia. Venous-pressure changes reflected the intrathoracic pressure changes. While the range of decompression was directly proportional to the percentage decrease of the systolic blood pressure, a correlation between the rate of the explosion and the cardiovascular response did not exist. Denervation of both carotid sinuses and cervical vagotomy did not abolish the cardiovascular response. The cardiovascular response was apparently mediated through pulmonary haemodynamic reflexes. (AD abstract)

2024

Rosenbaum, G., E. J. Pickering, and R. B. Willson 1952

THE ROLE OF MOTIVATIONAL LEVEL IN SIMPLE TRIAL-AND-ERROR LEARNING [Abstract]. — Amer. Psychologist, 7 (7): 255-256. 1952. DLC (BF1.A55, v. 7)

The effect of two motivational levels upon the acquisition of a simple motor reaction was studied. Subjects received equal practice in making a simple motor reaction either to the right or left side in response to a signal light located in the appropriate direction. A neutral central light was then presented and subjects were required to learn which of the two responses would turn out the light. High-drive instructions emphasized the importance of the experiment, while low-drive instructions stressed its routine nature. Reaction latency, errors, and trials to criterion were employed as measures of learning. The high-drive group exhibited faster reactions and more learning during the initial training trials on the alternate responses. In learning the "correct" response, their learning curves rose more slowly but reached the same limit as the low-drive group. High-drive subjects showed significantly poorer performance on the test trials in mean reaction latency, number of errors, and trials to criterion. It was concluded that motivation may serve to impede learning in situations involving competing reaction tendencies of equal strength. The results are discussed in terms of learning theory and implications for approach-approach conflict and ego-involved learning are cited.

2025

Rosenberg, N., C. E. Izard, and E. P. Hollander 1953

MIDDLE CATEGORY ("?") RESPONSE: RELIABILITY AND RELATIONSHIP TO PERSONALITY AND INTELLIGENCE VARIABLES. — Tulane Univ. Dept. of Psychology, New Orleans, La. (Contract Nonr-47502); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 077.01.01). Joint Project Report no. 1, June 16, 1953. i+14+5 p. AD 17 605

UNCLASSIFIED

An investigation was made of the Guilford-Martin and Bernreuter personality inventory question mark scores of several hundred naval aviation cadets in an effort to determine the reliability and relationship of these responses to personality and intelligence. The question mark scores from these tests were correlated with the Guilford-Martin trait scores, ACE scores, and years of schooling. Results indicate that the tendency to respond by question mark is a reliable trait as evidenced by the relatively high intercorrelations between the number of such responses from the tests used. The question mark scores were independent of intelligence. The conclusions recommend that personality trait scores should be adjusted by a factor representing the number of times the question mark category is used and the scoring procedures followed with respect to this category. (AD abstract)

2026

Rosenberg, N., and C. E. Izard 1953a

VOCATIONAL INTERESTS OF NAVAL AVIATION CADETS: PRELIMINARY FINDINGS. — Tulane

Univ., New Orleans, La. (ONR Project no. NR 154-098); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 077.01.03). Joint Project Report no. 3. July 31, 1953. 8+2 p. AD 22 209 UNCLASSIFIED

The importance of vocational interests, as measured by the Kuder Preference Record (KPR), for success in naval air training was investigated. The KPR, Vocational, Form B, was administered to 651 entering Naval Aviation Cadets (NAC), 137 NAC's near completion of their training, and 137 DOR's (dropped at own request). The results were compared with those of the Kuder norm group of 2667 adult males. Entering NAC's showed more interest than the norm group in scientific, artistic, musical, and mechanical activities; they were less interested than the norm group in clerical, literary, social service, persuasive, and computational activities. Successful NAC's were more interested than DOR's were in mechanical and scientific activities. The DOR group showed an essentially different interest pattern from the group eliminated from training in the AF in World War II. The KPR showed promise of validity for predicting DOR attrition. (AD abstract)

2027

Rosenblith, W. [A.], 1952a
L. L. Beranek, R. H. Bolt, R. B. Newman, J. J. Baruch, and S. Labate.
TENTATIVE CRITERIA FOR NOISE CONTROL DESIGN. — Jour. Acoust. Soc. America, 24 (4): 446. 1952. DLC (QC221.A4, v. 24)

Abstract of a paper presented at the 43rd Meeting of the Acoustical Society of America, held at New York, N. Y., May 8-10, 1952:

"Presented in this paper is a set of criteria that have been developed and applied on numerous noise control problems. An essential feature of the criteria is that they incorporate a specification of frequency dependence (usually expressed by octave bands) as well as overall sound pressure level. Tentative criterion curves are presented for: (a) risk of permanent damage to the hearing mechanism under habitual exposure to (1) continuous spectrum noises and (2) single frequency components; (b) speech communication conditions in terms of percentage intelligibility, voice level, distance between talkers, and type of vocabulary; (c) risk of annoyance to residential areas as dependent on type and previous noise conditioning of the community, daytime vs nighttime exposure, and the time pattern of the exposure. Emphasis is laid on the importance of interpreting these criteria in the light of the inherent variability among individuals in their responses to noise stimuli."

2028

Rosenblith, W. A., 1953
and K. N. Stevens
HANDBOOK OF ACOUSTIC NOISE CONTROL. II. NOISE AND MAN. — Bolt, Beranek and Newman, Cambridge, Mass. (Contract AF 33(038)-20572); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-204, June, 1953. ix+262 p. (RDO no. 695-63). AD 18 260 PB 111274

For volume I of this handbook see Bolt, R. H., 1952.

Volume II, which is intended as a guide in solving the problem of noise control, discusses the ways in which acoustic noise can be undesirable. The topics treated in particular are: basic bio- and psycho-acoustic data; effects of noise on human behavior; and human response criteria for noise control. Several subjective responses were analyzed and correlated with properties of the physical stimuli. Definitions of bio-acoustic terminology are given along with a description of the anatomy of the ear and the properties of aural protective devices. (AD abstract)

2029

Ross, B. B. 1952
RESISTANCE TO AIRFLOW DURING THE RESPIRATORY CYCLE. — Federation Proceedings, 11 (1[I]): 132. 1952. DLC (QH301.F37, v. 11)

Changes in resistance to airflow in the tracheobronchial tree may be brought about by changes in the geometry of the lung and changes in the magnitude of turbulent airflow. In terms of pressure required to produce a given flow velocity, resistance is described by the equation

$$P \frac{dV}{dt} = K - K' \frac{dV}{dt}$$

where K is influenced by the effective length and diameter of the tracheo-bronchial tree and K' by the effective angle of divergence of the branches of the tree. P is obtained from a catheter inserted through a tracheal cannula into a small bronchus of an anesthetized dog. Resistance values, obtained without respect to time, plotted against flow velocity, show turbulent resistance to be a linear function of velocity. By comparing resistance values obtained at specific times during the respiratory cycle with the above, the effect of changes in the configuration of the tracheo-bronchial tree may be evaluated. Any deviations would indicate a change in the constants K and K' previously described. Such a comparison reveals no significant change in resistance attributable to changes in the geometry of the lung tree during a respiratory cycle. (From the author's abstract)

2030

Ross, S. 1952
REPORT ON "SYMPOSIUM OF FATIGUE" OF THE ERGONOMICS RESEARCH SOCIETY, HELD 24-27 MARCH 1952 AT THE COLLEGE OF AERONAUTICS, CRANFIELD, ENGLAND. — Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. 21 p. (Contract DA-49-007-MD-222). AD 31 309
UNCLASSIFIED

The following papers, presented at this congress, are abstracted separately:

Browne, R. C., 1952
Bartlett, F., 1952
Darcus, H. D., 1952
Kennedy, J. L., 1952
Keys, A., 1952
Ladell, W. S. S., 1952
Noltie, H. R., 1952
Redfearn, J. W. T., 1952
Ryan, T. A., 1952
Singleton, W. T., 1952

2031

Ross, S., 1953
W. Ray, and L. D. Valle
POINTER LOCATION AND ACCURACY OF DIAL READING. — Jour. Applied Psychol., 37 (2): 131-135. 1953. DLC (BF1.J55, v. 37)

The purpose of this experiment was the determination of the relationship between accuracy of dial reading and the sector and specific location of the dial pointer. The three dials used were a semicircular upright dial, a semicircular inverted dial, and a circular dial. Ten subjects made a total of 4,100 judgments at five exposure times on the three dials. Tests of significance for error scores were made and permitted the following conclusions: Differences in dial shape were not an important source of error. Differences in sector location of the dial pointer were not an important source of error. Significant differences in error scores were found for readings made at 9, 12, 3, and 6 o'clock positions corresponding to pointer settings at 0, 5, 10, and 20 when compared with intermediate points. No significant differences in error scores were found when upper and lower dial halves were compared. These findings suggest that critical regions of a scale should be assigned to the 9, 12, 3, or 6 o'clock positions of a circular dial, and that factors other than errors may be considered in the choice of a dial from among the three types studied here. (From the authors' summary)

2032

Ross, S., 1953a
and J. L. Fletcher
RESPONSE TIME AS AN INDICATOR OF COLOR DEFICIENCY. — Jour. Applied Psychol., 37 (3): 211-213. 1953. DLC (BF1.J55, v. 37)

Response time measures to 15 selected plates of the AO pseudo-isochromatic test for color perception were secured for 136 college students (28 females, 108 males). Of this group, 110 were classed as normal, 26 as defective, on the basis of their error scores. Each subject was given two successive tests: criterion and test trials. Mean plate response times between the normal (0.66 sec.) and defective (1.93 sec.) groups were found to differ significantly. Practice effects were noted within the normal group, but were not found in the defective group. It was concluded that response time measures could be used in the separation of color normal from color defective individuals. (From the authors' summary)

2033

Roth, H. P. 1953
IMPACT AND DYNAMIC RESPONSE OF THE BODY. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 48-54 + 1 chart. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953.
DLC (TL670.C25, 1953)

The forces involved in free fall, sudden stops, parachute jumps, and crashes may be expressed best as the ratio of aggregate forces (due to acceleration, gravity, and inertia) to the force represented by the normal weight of the object. The force ratio (expressed in g) would be numerically equal to the acceleration ratio, but would be more desirable in analyzing the associated stresses of tension, compression, shear, and fluid pressure. The distinction between impact and acceleration is based on the difference between the time intervals involved during the application of external forces. Impact time ranges are less than one second and more nearly on the order of one-hundredth or one-thousandth of a second, while acceleration time is around 5 seconds. Studies of the effects of changes of external forces on the human body are important since internal stress patterns will change and cause deformation of elastic objects (organs, tissue, and body fluids). Experiments with the human decelerator represent the initiation of studies related to impact forces, their magnitude, variations during impact period, and rate of change. Engineering design of test equipment has aided further the physiologist's attempts to control the criteria of time, acceleration, and velocity of forces during experimental studies.

2034

Rothwell, W. S., 1953
and E. G. Sperry
ESCAPE FROM AIRCRAFT BY DOWNWARD EJECTION. — Jour. Aviation Med., 24 (4): 322-327. 1953. DLC (TL555.A1A4, v. 24)

In certain aircraft downward ejection offers advantages insofar as avoidance of fixed obstacles within the cockpit or on the upper surfaces of the fuselage is concerned. It is also desirable in multiplace jet aircraft to have some crew members eject downward in order to avoid the collision hazard which might exist if all used upward ejection. The absence of protruding structures on the under surface permits the use of lower ejection velocity which may be attained with an acceleration within physiological tolerance limits for negative g. However, special problems exist regarding harness suspension and support of the extremities. (Authors' summary)

2035

Rotondo, G. 1953
(ANATOMICAL AND HISTOPATHOLOGICAL STUDY OF SOME LESIONS FROM EXPLOSIVE DECOMPRESSION: AN ATTEMPT TO EXPLAIN THEM FROM AN ETIOPATHOGENIC POINT OF VIEW) Studio anatomo ed istopatologico e tenta-

tivo di spiegazione etiopatogenetica de alcune lesioni da "decompressione esplosiva". — Rivista di medicina aeronautica (Roma), 16 (2): 153-181. 1953. In Italian, with English, French, Spanish, and German summaries (p. 178-180).
DLC (TL555.A1R5, v. 16)

Autopsies were carried out on rabbits killed after exposure to explosive decompressions of various intensity (4,500 to 16,000 m., 5,000 to 18,000 m., and 1,000 to 18,000 m.). The following principal anatomical and histological changes were observed: (1) emphysema, congestion and hemorrhages of the lungs; (2) whitish spots penetrating to various depths in the liver; (3) flattening of the cerebral convolutions and congestion of meningeal vessels; (4) occasional ecchymotic subendocardiac hemorrhages; (5) dilatation and rupture of alveoli; (6) necrotic degeneration of liver tissues; (7) microscopic fissures and hemorrhages in the encephalon; and (8) fragmentation and transversal fissures of miocardiac fibers. These findings indicate that the anatomical and histological changes may be attributed to sudden pressure differentials in the body cavities and organic fluids. There is also evidence of purely mechanical effects of shock wave action similar to those due to air blast. Some instances of parenchymal fissures may be ascribed to the effects of aero-embolism.

2036

Roughton, F. J. W. 1953
DIFFUSION AND CHEMICAL REACTION VELOCITY IN CYLINDRICAL AND SPHERICAL SYSTEMS OF PHYSIOLOGICAL INTEREST. — Proc. Roy. Soc. (London), Series B, 140 (899): 203-229. 1953. DLC (Q41.L7, v. 140)

Equations expressing the rate of penetration of a substance into or egress from the zone included between two coaxial cylinders are applied to the exchange of dissolved gases between blood capillaries and surrounding tissues in mammalian organs. The following specific cases are investigated: (1) rate of elimination of nitrogen from human tissues, when applicable to subjects breathing oxygen for prolonged periods (as in pre-oxygenation treatment before high altitude flights); (2) rate of diffusion of carbon monoxide from the blood into the red muscle tissues of interest in the determination of total circulation volume; and (3) transient rate of diffusion of oxygen from the blood capillaries into red muscle tissues, when the partial pressure of oxygen in the capillary is suddenly changed.

2037

Roxburgh, H. L. 1953
DECOMPRESSION SICKNESS. — Medical Press (London), 229 (8): 174-178. 1953. DNLM

The time of development of symptoms in decompression sickness varies with the individual but is known to increase rapidly at altitudes over 25,000 ft. The symptoms include "bends", hypersensitivity of the skin, "chokes", abdominal distension, visual disturbances, or collapse. The onset of decompression sickness is affected by such factors as body type, amount of pre-exercise, temperature, oxygen supply, rate of ascent, altitude, and duration of exposure to altitude. The prevention of decompression sickness may be effected by adequate pressurization and denitrogenation before flight.

2038

Rubin, A., and J. Winston 1953
THE EFFECTS OF MENSTRUATION UPON VESTIBULAR FUNCTION IN NORMAL WOMEN. — Jour. Aviation Med., 24 (3): 234-236. 1953.
DLC (TL555.A1A4, v. 24)

The literature on the effects of menstruation on the vestibular function of women is reviewed. Attention is called to the belief of some authors that the ability of women to pilot aircraft may be adversely affected during their menses. The application of vestibular testing to fourteen normal women during various phases of their menstrual cycles and during menstruation is described. No significant differences were found in vestibular function tested during the first half as compared with the second half of the menstrual cycle, or during menstruation as compared with either the first or second half of the menstrual cycle. (Authors' summary)

2039

Ruch, F. L. 1953
BIBLIOGRAPHY ON MILITARY LEADERSHIP: ANNOTATIONS OF SELECTED STUDIES FROM SCIENTIFIC, TECHNICAL, AND RELATED PUBLICATIONS. — Psychological Services, Inc., Los Angeles, Calif. (Contract AF 505-039-0001); issued by Human Resources Research Inst., Maxwell Air Force Base, Ala. Technical Research Report no. 18, June 1953. 90 p. AD 25 681
PB 117995

This annotated bibliography is a by-product of an extensive review of the literature in areas related to combat leadership in the Air Force, set up as a part of a study of Air Force combat leadership and having the following objectives: developing a method for measuring the quality of combat performance in Air Force organizations based upon realistic and objective criteria; constructing patterns or working models of effective and ineffective leadership situations in combat climate; designing and testing indices for relating leadership to combat performance; developing useful instruments and manuals for the practical measurement and development of combat leadership and for identifying potential leaders for certain combat situations. Specific topics included are: military leadership; business and industrial leadership; educational and school leadership; public administration and civil service leadership; youth group leadership; social perception; self-inventory taking; and leadership criterion measure. (From the author's introduction)

2040

Rudnick, I. 1953

ACOUSTIC PROPERTIES OF PRESENT DAY MILITARY AIRCRAFT. — In: Benox report: an exploratory study of the biological effects of noise, p. 21-28. Univ. of Chicago, Ill. Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

The following data are discussed and represented diagrammatically: (1) maximum over-all intensity levels generated by various propulsive units of military planes; (2) directive patterns of the over-all sound pressure amplitude around various aircraft noise sources; (3) sound pressure levels in active bands relative to the over-all noise level of turbojet, ramjet, pulsejet, and rocket engines; and (4) acoustic power output as a function of exhaust jet-stream power for 19-inch turbojets. Conventional jet engines without afterburner are about 6-10 decibels noisier (125 decibels) than conventional propeller driven aircraft. Sound-level measurements on board carrier flight decks revealed sound levels between 130 and 140 decibels, and up to 150 decibels in the case of jet planes equipped with afterburners. Jet noises created by planes flying low over residential areas have become a serious problem. An F-84 type plane at takeoff under full power with afterburner operating, which passes 500 feet above residences at a speed of 200 m.p.h., will subject the houses in its path to a level in excess of 100 decibels for a time of about ten seconds.

2041

Rudolph, J. A. 1953

OPTIMUM MORALE: ITS IMPORTANCE IN AN ARMY GENERAL HOSPITAL--A SUGGESTED METHOD OF STUDY. — Military Surgeon, 113 (2): 103-108. 1953. DLC (RD1.A7, v. 113)

A technique is outlined to observe and record the progress of morale of patients confined in a military hospital over a longer perod. Based on observations of 300 cases, over a two-year period, the author has devised a chart, in which the progress of morale (normal civilian morale level = 100%) is plotted against time (in days). Such a typical "morale line" will decrease to about 5 to 10% below the normal civilian level during the first five days after admission to the hospital. It will then rise sharply, to reach its maximum (200% above normal civilian level, or full "military morale" level) on about the 30th day of hospitalization. From thereon it will dip sharply to a critical low on about the 50th day of hospitalization. If the patient is at this point returned to field duty, "he will assume a dubious, resentful, and slothful attitude; if discharged to civilian life, he will maintain a grievance against the Army and perhaps against society in general." A more thorough psychosomatic approach in the handling of patients, maintenance of consciousness of psychological factors in the restoration of patients, and discharge to duty at the earliest possible stage, are among the remedial measures recommended.

2042

Ruedi, L. 1953

OCCUPATIONAL INJURIES OF THE EAR. — Acta oto-laryngologica (Stockholm), 41 (3-4): 118-138. 1953. In English. DNLM

A detailed discussion is presented of the physiological implications of occupational deafness suffered upon exposure to factory noise. Among the occupational diseases of the ear, mention is made of aerotitis media. In two samplings of 100,000 airmen, 6% in the first series and 16.6% in the second suffered from aerotitis media. In addition, 27% in the first group and 50% in the second showed alterations of the drum. There is a discrepancy of opinion in the literature about the role of infections, such as inflammation of the naso-pharyngeal tract, hypertrophy of the adenoids, abnormalities of the septum, or chronic tonsilitis or sinusitis. While in 100 airmen suffering from aerotitis media one third complained of some of the enumerated conditions, in another experiment, conducted with 15,000 airmen, no essential relationship could be detected between common cold and aerotitis media. However, it is warranted to postulate that pilots suffering from common cold should not fly.

2043

Rummel, R. W. 1953

SURVIVAL CONSIDERATIONS FOR HIGH-ALTITUDE TRANSPORTS. — Skyways, 12: 14-15, 45-47. Dec. 1953. DLC (TL501.S634, v. 12)

At altitudes above 25,000 ft., the limits of useful consciousness are reduced to less than 60 seconds because of hypoxia. In transport planes, the fuselage, the cabin, the cockpit windows, the compartment bulkheads, and the doors must be so designed as to retain pressure for maximal comfort and survival of crew and passengers. Complete oxygen distributing systems must be made available to all passengers and a device should be installed to provide the cabin with oxygen in the case of pressurization system failure.

2044

Ryan, T. A. 1952

MUSCULAR POTENTIALS AS INDICATORS OF EFFORT IN VISUAL TASKS. — In: Ross, S., Report on "Symposium of Fatigue" ..., p. 14-15. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

It was the purpose of this study to explore the relationship of muscular potentials to (1) the difficulty of a task; (2) the effects of surrounding conditions such as noise; and (3) the alertness of the subject. Test subjects were given a task of visual inspection performed at a controlled speed. Potentials from three areas of the body were recorded during such performance. No attempt was made to immobilize the subjects or to induce them to relax. Statistically significant increments of potentials in all areas studied were observed during work performances

under severe glare. Muscular potentials changed markedly during variations in the complexity of tasks (at a constant rate of performance). No effects of changes in the level of illumination on potentials were observed within the range of 2 ft.-candles to 50 ft.-candles. Likewise, no correlation between mechanically recorded pressures (operation of a signal key) and muscle potentials could be established.

2045

Salgueiro, B. 1953
[THE EUSTACHIAN TUBE: PROBLEMS ARISING FROM THE MODERN WAY OF LIFE] A trompa de Eustaquio: problemas que a vida moderna suscita. — Revista portuguesa de medicina militar (Lisboa), 1 (2): 295-302. 1953. In Portuguese.

The anatomy and physiology of the eustachian tube is analyzed in great detail. The comfort and safety of airplane passengers depend on the proper function of this organ. The etiology and pathogenesis of aerotitis media is described. Changes of barometric pressure at sudden descent may result in failure of the tube to open. The pressure difference is proportional to the speed of descent, the density of air, and to the degree of hypoxia. Prevention against aerotitis media consists of reducing the speed of descent, and in teaching ventilation techniques of the ear (mastication, swallowing, clenching of the teeth, etc.). Anatomical lesions, and deformations or pathological changes of the pharynx (adenoids), of the nasal fossae (deviation of the septum), and of the oral cavity (dental malformations) may all contribute to the obstruction or impairment of the patency of the eustachian tube. In addition, allergies, lack of oxygen, low altitude and innate individual deficiencies have to be considered.

2046

Samsonova, V. G. 1953
[VISIBILITY CURVES OF NIGHT VISION] Krivye vidnosti nochnogo zreniia. — Problemy fiziologicheskoi optiki (Moskva & Leningrad), 8: 26-38. 1953. In Russian. DNLM (W1. PR5815, v. 8)

The visibility curves of night vision were determined in 6 subjects by measuring the absolute achromatic light sensitivity thresholds in the central fovea, at the border of the central fovea and in the macular zone, at the border of the macular region, and at the periphery of the retina (10° from the center). The study of light sensitivity thresholds reveals that in the majority of subjects, in the range of 440-660 mμ, foveal vision of the dark-adapted eye approaches peripheral vision to a greater degree than that of the light-adapted eye. In the range of 510-520 mμ an "apparatus of twilight vision" appears to function in the central fovea, which is considerably weaker than the "apparatus" contained in the peripheral retina, and does not exist in all individuals. The greatest differences in sensitivity were found after blue-green light stimulation. In the foveal region individual differences among the various subjects reached a multiple of 36, whereas the maximum difference in peripheral perception was at most double. These data show that there exists a strict differentiation between day and night vision mechanisms. The majority of people have in the central fovea an apparatus of night vision, while an apparatus of day vision is found in the peripheral retina. People whose achromatic interval was either partly or completely absent (λ = 530-540 mμ) had a highly developed day vision apparatus and poorly or undeveloped night vision within the foveal region.

2047

Sandegard, K. E. 1953
[PRINCIPLES AND INDICATIONS FOR RELEASE FROM AIR SERVICE BECAUSE OF INJURIES AND DISEASE OF THE OSTEOARTICULAR SYSTEM] Principer och indikationer for avkoppling fran flygtjänst pa grund av skador och sjukdomar i rorelseapparaten (RA). — Meddelanden fran flyg- och navalmedicinska nämnden (Stockholm), 2 (3): 5-7. 1953. In Swedish.
DNLM (W1. SW387, v. 2)

A statistical survey is presented of the major causes of incapacitation among flight personnel in the Swedish Air Force. Stomach ailments, drinking, intestinal inflammation, and crippling injuries of the osteoarticular system are the chief causes; concussions, fractures, sprains, and contusions lead the other causes. Concussions, and fractures of the extremities are the most frequent traumas to which flight personnel are subjected. Colle's fracture, a transverse fracture of the lower end of the radius which displaces the hand backward and outward, is the most common type. It is treated by immobilization of the lower arm for at least 12 days before the pilot can return to his flying duties. The navicular bone of the foot is also fractured often by pilots; but, in this case, the author suggests that the injured foot not be immobilized, but treated with a local anesthetic to relieve pain and the pilot returned to duty. Next in order of frequency are fractures of the fibula, the ribs, the pelvis, and other small bones of the hands and feet; the author does not describe treatment for these fractures.

2048

Sarnoff, S. J., 1952
and E. Berglund
PRESSURE-VOLUME CHARACTERISTICS AND STRESS RELAXATION IN THE PULMONARY VASCULAR BED OF THE DOG. — Amer. Jour. Physiol., 171 (1): 238-244. 1952.
DLC (QP1. A5, v. 171)

Using an isolated lung preparation, the pressure-volume relationship of the pulmonary vascular bed and left auricle has been studied. For any given volume of blood in the system the pressure is higher while blood volume is increasing than while it is decreasing. This is presumably due to stress relaxation which begins to occur at levels above 15 to 30 mm. Hg and becomes progressively more pronounced as the pressure is increased. The left auricle-pulmonary vein preparation, with

leakage excluded, shows the same characteristics. The pressure-volume curve of the pulmonary vascular bed is the same at different temperatures (28.9°-39.4°C). (Authors' summary and conclusions)

2049

Sataloff, J. 1953
EFFECT OF PROLONGED EXPOSURE TO INTENSE NOISE ON HEARING ACUITY. — A. M. A. Arch. Otolaryngol., 58 (1): 62-80. 1953. DLC (RF1.A7, v. 58)

Comprehensive hearing studies were performed over an approximate five-year period on 272 subjects who were daily exposed to a specific type of jet-engine noise. The intensity and frequency characteristics of the noise and the duration of each subject's exposure were correlated with any significant changes in hearing. Ambient-noise levels were evaluated, as was the effect of auditory fatigue, in order to obtain stabilized hearing thresholds. The following conclusions are suggested. There is considerable indication that a certain steady-state jet-engine noise with intensity fluctuations between 90 and 120 db. and with sound energy predominantly in the frequencies below 600 cycles is not hazardous to the hearing of exposed personnel. Personnel exposed to steady-state moderately intense low-frequency noise may sustain measurable degrees of auditory fatigue daily for many years without sustaining any significant degree of permanent hearing impairment. None of the subjects in this study who were exposed to moderately intense low-frequency noise for periods up to five years showed any change in hearing acuity in the frequencies 1024 and 2048. None of the subjects in this investigation sustained changes in hearing acuity greater than 30 db. at 4096 and 8192. None of the changes in hearing occurring in any of the subjects in this study can definitely be attributed to exposure to jet-engine noise. (From the author's summary and conclusions)

2050

Sattes, H. 1953
[VERTICAL NYSTAGMUS AND AUTONOMOUS DISTURBANCES AS BLAST INJURIES] Vertikaler Nystagmus und vegetative Anfälle als Detonationsschädigung. — Nervenarzt (Berlin), 24 (2): 128-130. 1953. In German. DNLM

The pathological symptoms observed in a young man, after he had been exposed to an explosion of a diesel motor without suffering any immediate external trauma or other outward effects, are described in detail. Repeated medical examinations revealed: labyrinthal concussion, vertical spontaneous nystagmus at every sideward glance or forward bending of the head, as well as a tendency to horizontal nystagmus (indicating a residual cerebral concussion), headaches, eye tremor, vertigo and nausea after each (even the slightest) motion of the head, and periodical spasms accompanied by muscular rigidity, pain in one arm, and loss of speech. Caloric tests revealed bilaterally sensitized labyrinths. Over a period of eleven years no improvement was noted. There was no pathological reaction upon peripheral stimulation. The central nervous, organic origin of the disturbances was certain. Epilepsy or a psychogenic origin of the disorder could be definitely ruled out. The origin of the vertical nystagmus appeared to be due to a lesion of Deiters' nucleus region, at the bottom of the fourth ventricle.

2051

Scano, A. 1953
(A PORTABLE AUTOMATIC APPARATUS FOR CARRYING OUT A PROLONGED ARTIFICIAL RESPIRATION AND THE RESUSCITATION OF APNOIC SUBJECTS) Dispositivo automatico portatile per praticare la respirazione artificiale protratta e la rianimazione in soggetti apnoici. — Rivista di medicina aeronautica (Roma), 16 (1): 31-40. 1953. In Italian, with English, French, Spanish, and German summaries (p. 39). DLC (TL555.A1R5, v. 16)

This portable artificial respirator works on the principle of rhythmic pneumatic compression and decompression of the thorax. It consists basically of the following parts: (1) an inflatable jacket strapped around the thorax and the upper abdomen; (2) a respiratory mask covering mouth and nose and fastened by means of straps to the nape of the neck; (3) an automatic regulating device controlling the alternating flux of air or oxygen; and (4) a manually operated pump, which may be substituted by containers of compressed air or oxygen. The apparatus was tested on four healthy subjects who applied voluntary apnea following two minutes of self-induced hyperventilation. Pulmonary ventilation induced by the respirator during the apneic state approached the values of spontaneous ventilation. Likewise, the respiratory rate, the pulse rate and the arterial oxygen saturation were close to normal.

2052

S[cano], A. 1953a
[THE USEFULNESS OF SAFETY BELTS IN THE PREVENTION OF INJURIES FROM AIRPLANE CRASHES] L'utilità delle cinghie di sicurezza nella prevenzione delle lesioni da incidenti di volo. — Rivista di medicina aeronautica (Roma), 16 (4): 633-636. 1953. In Italian. DLC (TL555.A1R5, v. 16)

This is a review of the paper, DeHaven, H., 1952b.

2053

Scarinci, C., 1952
E. Gianturco, and P. Notario
[THE ROLE OF ANGIOPNEUMOGRAPHY IN THE EXPLORATION OF PULMONARY ARTERIAL CIRCULATION DURING TEMPORARY ANOXIA IN MAN] L'intérêt de l'angiopneumographie pour l'exploration de la circulation artérielle pulmonaire chez l'homme dans l'anoxie temporaire. — Presse médicale (Paris), 60 (73): 1550-1551. 1952. In French. DNLM

Angiopneumographic pictures were taken on a normal subject after occlusion of the left basic bronchial trunk. Disturbances in pulmonary ventilation induced hypovascularization and vasoconstriction (i.e., the typical response of arterial

pulmonary circulation to anoxia) on the left, and compensatory circulation in the normally ventilated right lung. Thus a clear correlation between pulmonary ventilation and arterial pulmonary circulation could be established.

2054

Schaefer, H. J. 1952d
EXPOSURE HAZARDS FROM COSMIC RADIATION BEYOND THE STRATOSPHERE AND IN FREE SPACE. — Jour. Aviation Med., 23 (4): 334-344, 401. 1952. DLC (TL555.A1A4, v. 23)

Essentially the same as the report, Schaefer, H. J., 1952b.

2055

Schaefer, H. J., and E. Stuhlinger 1953
THE RATE OF ENERGY LOSS (REL) IN THE TERMINAL SECTION OF HEAVY NUCLEI TRACKS IN LIVING TISSUE. — Naval School of Aviation Medicine, Pensacola, Fla. March 11, 1953. 17 p. (Project Report no. NM 001 059.13.05). AD 10 803 UNCLASSIFIED

The possible health hazard resulting from exposure to high-altitude cosmic radiation was investigated. Calculations were made of the rate of energy loss (REL) for the terminal portion of heavy-nuclei tracks. The REL was determined as a function of their kinetic energy and residual range in living tissue for Sn, Fe, and Mg. The maximum REL in ion pairs per 10 micra of tissue is given as 1,860,000, 1,590,000, 1,000,000, 734,000, 509,000, and 351,000 for Sn, Cb, Fe, Ca, Mg, and C, respectively. A value of 100,000 is suggested to represent the lower limits of REL in the most active portion of the nuclear track. The maximum of REL appears to occur at a considerably lower energy than that of the initial electron capture. (AD abstract)

2056

Schaefer, H. J. 1953a
THEORY OF PROTECTION OF MAN IN THE REGION OF THE PRIMARY COSMIC RADIATION. — Naval School of Aviation Medicine, Pensacola, Fla. Aug. 5, 1953. 8+9 p. (Project Report no. NM 001 059.13.06). AD 17 902 UNCLASSIFIED

In two preceding reports under the same project (cf. Schaefer, H. J., 1952c, 1953) the microspatial distribution of the ionization dosage along a heavy nucleus track in tissue has been derived in quantitative terms in its radial and its longitudinal component. It was shown that in the terminal section of the tracks (the so-called thin-down part) the ionization dosage reaches excessively high values. The present report supplements the previous data by deriving the actual number of thin-down hits per hour in a "standard man" for all altitudes and latitudes and for all components of the heavy spectrum. On the basis of these data, the problem of protection from thin-down hits by shielding is investigated. It is seen that insufficiently thick shielding layers can act as intensifiers and actually increase the number of hits. The relationships between the thickness of the shielding layer and the number of hits are presented in graphs. They show that the weight requirements for efficient shielding are prohibitively high. Protection of man from thin-down hits of heavy nuclei thus seems possible only by limiting the exposure time. Quantitative data for it cannot yet be established. (From the author's summary)

2057

Schaefer, K. E. 1953
STUDIES OF OXYGEN TOXICITY. II. A WARNING SIGN OF ACUTE SYMPTOMS OF OXYGEN TOXICITY. — Naval Medical Research Lab., New London, Conn. Report no. 232 (vol. 12, no. 17), Aug. 4, 1953. iii+24 p. (Project Report no. NM 002 015.03.09). AD 36 520 UNCLASSIFIED

Twelve trained underwater swimmers swam at an average speed of 0.98 m.p.h. at various depths (surface, 20, 30, and 40 ft.) over a period of 93 min. with rest periods every 15 min. Pulse and respiratory rates were measured prior to and after swimming and during rest periods. Under these conditions, the bradycardia effect from breathing O_2 was confirmed. An increased sympatheticotonic activity was believed to accompany symptoms of O_2 toxicity. Dyspnea was the most frequent symptom during underwater swimming while breathing O_2 at pressures higher than atmospheric; dyspnea was most often associated with rapid, shallow breathing and inspiratory inhibition. In addition to the parasympathetic and sympatheticotonic stimulations when symptoms occur, the following phase of O_2 effect was observed: a complete parasympathetic dominance (in regard to heart rate) as shown by nonresponsiveness of pulse rate to change in activity from exercise to rest and from rest to exercise. Since this sign preceded the development of symptoms such as convulsions, the use of this sign as a warning of O_2-toxicity symptoms was considered possible. (AD abstract)

2058

Schaefer, K. E., and C. Carey 1953a
EFFECT OF INCREASED CO_2 CONCENTRATIONS ON FLICKER FUSION FREQUENCY AND ALPHA BLOCKING TIME. — Federation Proceedings, 12 (1[I]): 125. 1953. DLC (QH301.F37, v. 12)

Ten subjects were exposed to concentrations of 1.5, 3.4, 5.4, and 7.5% CO_2 over a period of 20 minutes. Ten minutes were allowed for dark adaptation. During this time a steady state in respiration was reached as indicated in respiratory minute volume and alveolar CO_2. F.F. threshold was measured with a Krasno-Ivy Meter. E.E.G. records were taken from 4 leads using a 6 channel Grass instrument. Light stimuli of constant brightness and 10 sec. duration were applied at least 3 times during 1 exposure. Results indicate that concentrations of 5% CO_2 and higher produce a significant drop in F.F.F., a decreased qualitative blocking effect and an increased alpha blocking time. (Authors' abstract, modified)

2059

Schafer, G. E. 1953
[AVIATION ACCIDENTS IN AERIAL GUNNERY EXERCISES: POSSIBLE FACTORS IN THE RECONSTRUCTION OF AN ACCIDENT] Accidents d'aviation dans les exercises de tir au sol. Facteurs possibles de la reproduction de ces accidents. Médecine aéronautique (Paris), 8 (1) : 87-92. 1953. In French. DLC (TL555.M394, v. 8)

Factors relevant to accidents of fighter planes but excluding mechanical failures are discussed. The following are the components of error in judgment which individually or combined are conducive to accidents: (1) Estimation of distance (depth perception), which is difficult to judge when flying above water or desert regions because spatial orientation and stereoscopic vision are handicapped. (2) The full concentration of the pilot on the target during strafing may result in "fascination", distracting his attention from the environment and the proximity of the ground. (3) Accommodative asthenopia is responsible for the difficulty to perceive and calculate distances; at tropical air bases a chronic form of this condition is due to glare experienced under that climate. (4) Inability to estimate correctly the visual angle and the apparent dimensions; this factor is mostly dominant when the machine gun is used at a raised angle at altitudes above 2000 ft. --In each strafing maneuver there is a flight plan and an attacking pattern. Each time an error is made in any of the enumerated factors, a period of time exists between the occurrence and the realization of the error; this time-lag is known as the reaction time. In view of the above, it is recommended that conspicuous and familiar objects be placed in the vicinity of the target zone in the peripheral visual field of the pilot.

2060

Schieve, J. F., 1953
and W. P. Wilson
THE CHANGES IN CEREBRAL VASCULAR RESISTANCE OF MAN IN EXPERIMENTAL ALKALOSIS AND ACIDOSIS. — Duke Univ. School of Medicine, Durham, N. C. (Contract AF 33(038)-27878); issued by School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii+6 p. (Project no. 21-1601-0014, Report no. 3). AD 19 666
PB 112140

Cerebral vascular resistance (CVR) was studied in relation to (1) metabolic alkalosis produced by intravenous injections of hypertonic and isotonic solution of $NaHCO_3$, (2) metabolic acidosis produced by solution of 0.8% NH_4Cl, and (3) injections of isotonic and hypertonic NaCl solutions. Metabolic acidosis, as produced by NH_4Cl, was accompanied by a reduction in cerebral blood flow (CBF), in contrast to respiratory acidosis in which CBF was increased. $NaHCO_3$ increased CBF by decreasing CVR. The cerebral vascular tone was more closely related to the total CO_2 content of arterial blood than to arterial pH levels. The bicarbonate-ion content of arterial blood was more important in regulating CV tone than was the CO_2 tension of arterial blood. (AD abstract)

2061

Schieve, J. F., 1953a
and W. P. Wilson
THE INFLUENCE OF AGE, ANESTHESIA, AND CEREBRAL ARTERIOSCLEROSIS ON CEREBRAL VASCULAR ACTIVITY TO CARBON DIOXIDE. — Duke Univ. School of Medicine, Durham, N. C. (Contract AF 33(038)-27878); issued by School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii+5 p. (Project no. 21-1601-0014, Report no. 4). AD 19 696 PB 112015

Cerebral vascular reactivity to carbon dioxide is high in normal adult people of all age groups, and there is only gradual reduction in reactivity with the normal aging process. In severe cerebral vascular disease, cerebral vascular reactivity to carbon dioxide is greatly reduced. The response to carbon dioxide is altered by thiopental anesthesia deep enough to reduce the cerebral metabolic rate by 40 percent. Cerebral vascular reactivity to carbon dioxide can be utilized to separate certain patients with senile dementia due to primary parenchymal brain degeneration from dementia secondary to cerebral vascular disease. A normal high increase in cerebral blood flow after carbon dioxide makes the diagnosis of generalized cerebral vascular disease highly improbable, while a poor response may or may not indicate its presence. (Authors' abstract)

2062

Schmidt, Ingeborg 1952b
EFFECT OF ILLUMINATION IN TESTING COLOR VISION WITH PSEUDO-ISOCHROMATIC PLATES. — Jour. Optical Soc. Amer., 42 (12): 951-955. 1952. DLC (QC350.O6, v. 42)

The intensity and the spectral energy distribution within ranges found in natural daylight have a certain effect on the interpretation of pseudo-isochromatic plates. A variation of illumination between 270 and 1000 lux (candle-meter) affects color defectives, the error percentage on plate tests decreasing slightly with higher illuminations. This decrease is chiefly found in deuteranomalous subjects. The color temperature of the illumination affects the number of errors made by both normals and color defectives. As the color temperature is increased, the error percentage increases slightly in normals, distinctly in deuteranomalous, and less noticeably in deuteranopes. Protanomalous and protanopic subjects do not show a significant effect. On the average, the same percentages of errors result when either a Macbeth easel daylight lamp or a fluorescent daylight lamp is used for the illumination of the plates, provided the same intensity is present. --- It is recommended that only artificial daylight of a standardized color temperature and intensity be used to obtain comparable results in pseudo-isochromatic plate tests. (Author's abstract)

2063

Schmidt, Ingeborg 1953
EVALUATION OF THE GRETHER SELF-ADMINISTERING COLOR VISION TEST. — School of Aviation Medicine, Randolph Field, Tex. Special Report, March 1953. 10 p. AD 12 616
PB 109680

The Grether self-administering color-vision test (SACVT) was evaluated as a measure of the subject's ability to match a mixture of primary colors (red, green, and blue) with a neutral point (white), anomaloscope (yellow), and orange stimuli. The stimuli are automatically alternated, and the results are recorded by a self-regulating system. The SACVT accurately screened all color defectives, but misclassified many of the 141 subjects rated normal by the pseudoisochromatic plates of the American Optical Company, the School of Aviation Medicine color threshold test, and the Nagel anomaloscope. Only an approximate qualitative and quantitative classification of color defectives was accomplished by the SACVT in comparison with the Nagel anomaloscope. Recommendations include: (1) enlarging the normal ranges; (2) omitting the orange stimulus; and (3) increasing the number of tests. (AD abstract)

2064

Schmidt, Ingeborg, and A. G. A. Bingel 1953a
EFFECT OF OXYGEN DEFICIENCY AND VARIOUS OTHER FACTORS ON COLOR SATURATION THRESHOLDS. — School of Aviation Medicine, Randolph Field, Tex. April 1953. iii+21 p. (Project no. 21-31-002). AD 16 372 PB 110686

The effects of hypoxia, alcohol, and coffee on the saturation thresholds of red, green, and blue were studied with a color saturation threshold meter. Hypoxia, up to a simulated altitude of 5.5 km (18,000 ft.), produced a small deteriorating effect (significant only to the 5% level) on the recognition of green and blue. Alcohol, equivalent to 60 cc. of absolute alcohol, impaired the recognition of all three colors for at least 30 minutes, probably by affecting sensory centers. Coffee with 0.16 g. of caffeine improved the recognition of red and blue. Recommendations include the avoidance of alcohol before high-altitude flights and the use of oxygen during flights. (AD abstract)

2066

Scholz, W. 1953
SELECTIVE NEURONAL NECROSIS AND ITS TOPISTIC PATTERNS IN HYPOXEMIA AND OLIGEMIA. — Jour. Neuropathol. and Exper. Neurol., 12 (3): 249-261. 1953. DNLM

The vulnerability of specific nerve-cell types and topistic units is noted in anoxic anoxia: first the globus pallidus, corpus Luysi, and corpus striatum are affected, and later, the cerebral and cerebellar cortices. In carbon monoxide poisoning, secondary anemias, accidents during anesthesia, and in fatal anoxias after flights at high altitudes, symmetrical pallidum necrosis also occurs in man.

2065

Schoeni, A. L. 1953
ANGELS ON PINWHEELS. — Sperryscope, 12 (12): 4-9. 1953. DLC (VK577.S67, v. 12)

The development of the helicopter as a rescue tool has proved invaluable in saving lives of service personnel. During 1944, a winch and sling mechanism was tested and proven for the transport of injured and exhausted individuals to hospital area. Some medical air evacuation units are equipped to deliver blood transfusions during flight. The Air Force has established a parachute-equipped medical unit. Men in this unit are employed particularly over rugged terrain and over the sea, carrying medical aid with them.

2067

(School Aviat. Med. Gunter) 1953
CURRICULUM: INDOCTRINATION COURSE FOR OFFICERS OF THE MEDICAL SERVICE. — School of Aviation Medicine (Gunter Branch), Gunter Air Force Base, Ala. May 1, 1953. iii+29 p. AD 30 378 UNCLASSIFIED

The course outlined in this report is conducted by the Gunter Branch of the US Air Force School of Aviation Medicine. A total of 156 curriculum hours is presented during four weeks. Its purpose is to provide new officers of the Air Force Medical Service with a basic understanding of the organization, function, procedures, and traditions of the U.S. Air Force and its Medical Service. This is accomplished through an integrated series of lectures, demonstrations, and exercises. A comprehensive survey of professional, administrative, and personal responsibilities of an officer of the Air Force Medical Service is presented in the following areas: (1) duties and responsibilities of Air Force officers; (2) military medicine (medical problems specific to the conduct of health services and military conditions, including both professional and medical administrative practices); (3) special procedures of the Air Force Medical Service (basic orientation on aviation medicine, including aviation physiology, air evacuation, aircrew effectiveness program, medical training of flyers, aircraft accidents, industrial medicine, and special Air Force dental problems); and (4) duties and responsibilities of the different corps of the Air Force Medical Service. (Excerpt from p. 1, modified)

2068

Schowalter, E. J. 1952
AUDIOMETRIC DATA FOLLOWING EXPOSURE TO LOW-FREQUENCY-CENTERED NOISE. — A. M. A. Arch. Indus. Hyg. and Occupational Med., 5 (5): 430-435. 1952. DLC (RC963.A14, v. 5)

Audiometric and environmental findings are tabulated of industrial workers exposed, for a period of approximately five years, to noises up to 150 c.p.s. Exposure to noises that have overall levels between 90 and 101 decibels apparently does not cause significant hearing loss, provided the energy concentration of the noise is 150 c.p.s. or lower. It is believed that these data emphasize the need of additional studies correlating noise exposure with audiometric findings.

2069

Schreffer, P. A. 1953
SEEING RED IN THE COCKPIT. — Flying Safety, 9 (4): 2-5. 1953. DLC (UG633.F55, v. 9)

The visual problems associated wich cockpit lighting and external illumination during takeoff and night flight are described. In order to improve night vision the use of white lights inside the cockpit when white lights are present on the outside is recommended. Red lights should be used in the cockpit when the aircraft is airborne. It is highly recommended that fluorescent lights should be installed as auxiliary lights in the event of failure of the other light sources.

2070

Schreiber, R. J. 1953
HUMAN ENGINEERING CLEANS UP THE INSTRUMENT PANEL. — Aviation Age, 19 (4): 50-54. 1953. DLC (TL501.A8187, v. 19)

The major cause of aircraft accidents in the past few years has been pilot error, according to available statistics. However, most of the pilot errors are not of the type where the pilot does something incorrectly; rather, the indications are that the pilot has so many things to do at once that he can not do them all. Thus it is obvious that there is great need to simplify the instrument panel, which feeds information to the pilot from the airplane. There are 5 major information links from the plane to the pilot; it is here that simplification must take place if efficiency is to be increased: (1) there is the information that is never used in making a decision--no need for instruments; (2) there is information which leads to a single decision--one instrument; (3) there is information which comes from several sources to call for a single decision--discretion is needed to keep instruments to a minimum; (4) there is that information which comes from a single source and requires several decisions--a single instrument is needed; and (5) there is the information which comes to the pilot through his experience with similar situations and calls for no instrumentation.

2071

Schreiber, R. J. 1953a
DIAL DESIGN—IS YOURS UP TO DATE? — Aviation Age, 20 (2): 66-68. 1953. DLC (TL501.A8187, v. 20)

It is recommended that, in the design of instrument panels, the designer keep in mind that a large group of the necessary instruments will be checked at infrequent intervals only. It is suggested that these instruments be grouped together, with the pointers aligned at 9 o'clock when the dials are registering normal function. Thus, any abnormal deviation would be apparent to the pilot at a glance. In designing the dials for readability, graduations should be in multiples of 10 and should be spaced sufficiently far apart to be easily read; also, the pointer of the dial should be short and narrow enough not to obscure any of the dial graduations. If the dial is of the type that is viewed through a window, the window should be large enough so that 2 numerals are exposed simultaneously to the viewer.

2072

Schreiber, R. J. 1953b
GOOD CONTROLS DESIGN MAKES PILOT'S JOB EASIER. — Aviation Age, 20 (3): 60-62. 1953. DLC (TL501.A8187, v. 20)

The author feels that in the design of controls "natural" actions and observations on the part of the pilot should always be kept in mind. Controls that turn should turn in a clockwise direction; dials should read in an increasing progression, clockwise. Horizon indicators should use the plane as a reference when showing turns and banks; use of the earth as a reference for the plane is apt to be confusing. Controls should be easy to grasp; and in those cases where several controls must be grouped together outside the field of vision of the pilot, they should have coded control knobs to identify each. Six of the most important controls -- throttle, wing flaps, propeller pitch, mixture, landing gear, and cowl flaps -- should always have coded, shaped knobs to identify them. Also, selector switches should be of the slender "barrel" type, longer than they are wide; and the markers for the switches must have at least 45° separations between positions.

2073

Schultz, I. J. 1953
STUDY OF CLASS IV AIRMEN WHEN DIVIDED INTO TWO GROUPS RANGING IN ARMED FORCES QUALIFICATION TEST SCORES OF 10 TO 20 AND 21 TO 30. — 3700th Military Training Wing, Lackland Air Force Base, Tex. Personnel Sutdy no. 53-1, Jan. 1953. vi+48 p. AD 2165 UNCLASSIFIED

Class IV airmen (2674) obtaining Air Force Qualification Test (AFQT) percentile scores of 10-20 were compared with those (2520) attaining scores of 21-30, to ascertain whether any significant differences exist with regard to certain personal characteristics, Aptitude Index (AI) scores, and assignments. The marked differences in the AFQT and AI scores, and final assignments indicated a definite division among these airmen. It is uncertain whether 21 is the best divider. (AD Abstract)

2074

Seeler, H. W., and D. R. Good 1953
AUTOMATIC RESUSCITATOR. — Jour. Aviation Med., 24 (1): 63-69. 1953. DLC (TL555.A1A4, v. 24)

A resuscitator for use in aircraft at high altitude has been developed by personnel of the Aero Medical Laboratory, Wright Air Development Center. To provide a completely versatile instrument for experiment in this development, a unit has been

designed which can be operated on air, oxygen, or a mixture of the two. The gas pressure required is sufficiently low as to permit not only the use of compressed gas cylinders but also a small compact blower type of compressor. The resuscitator can be adjusted to produce breathing cycles ranging in pressure extremes from a small negative value to positive pressures up to 30 millimeters of mercury. Intermediate adjustment can be made to any desired range within these two extremes. It is of the pneumatic balance type and is compensated for the effect of altitude on the cycling rate which varied considerably with altitude in previous models of this type. (Authors' abstract)

2075

Seitz, C. [P.] 1953
THE H FACTOR IN ENGINEERING DESIGN. — Aeronaut. Eng. Rev., 12 (3): 42-43. 1953.
DLC (TL501.A326, v. 12)

In designing equipment an engineer needs to know more about the Human Factor (H) in order to appreciate the range and reserve of human performance and to recognize that personality and morale are also important factors. The author feels that provisions should be made for engineers to gain further insight into the problems of psychology and human engineering.

2076

Selkurt, E. E. 1953
INFLUENCE OF HYPOXIA ON RENAL CIRCULATION AND ON EXCRETION OF ELECTROLYTES AND WATER. — Amer. Jour. Physiol., 172 (3): 700-708. 1953. DLC (QP1.A5, v. 172)

Response of the kidney to hypoxia created by perfusion with venous blood obtained from the right ventricle was studied in anesthetized dogs. A pump aided in supplying the blood with an adequate head of pressure. The advantage of the method was that it permitted a specific hypoxia to be imposed upon the kidney with minimal disturbance to the organism as a whole. Blood oxygen content in different experiments varied from 6.7 to 15.9 volume per cent during venous perfusion (average, 10.7). The most consistent response was an increase in para-aminohippuric acid clearance, in one instance as great as 92%, but averaging 22%. Renal vascular resistance showed a typical reduction during hypoxia. The nature of the hyperemia has not been elucidated. Creatinine clearance characteristically decreased by an average of 10%. The net effect was therefore a reduction in the filtration fraction. The usual response in the excretion of sodium, potassium, and water was an increase. Because excretion increased while filtration rate declined in several experiments, the conclusion followed that hypoxia had impaired slightly the tubular reabsorptive processes of these substances. (Author's summary)

2077

Sells, S. B., 1953
and J. R. Barry
A RESEARCH PROGRAM TO DEVELOP PSYCHIATRIC SELECTION OF FLYING PERSONNEL. I. THEORETICAL APPROACH AND RESEARCH DESIGN. Jour. Aviation Med., 24 (1): 29-35. 1953.
DLC (TL555.A1A4, v. 24)

The selection of flying personnel based upon psychiatric examination is prognostic rather than diagnostic. Psychiatric success or failure depends upon the intrinsic personality resources of the individual to adjust in relation to environmental pressure. Psychiatric selection is basically a problem of the assessment of dynamic traits of personality, which will require appropriate techniques of measurement and statistical treatment. A test development program has been inaugurated which consists of three stages: (1) the development and validation of specific measures of traits or behaviors; (2) the initial field tryout, at the basic pilot training level of provisional experimental selection tests; and (3) incorporation of those tests which have been proven valid in the field tryout, into batteries of experimental tests.

2078

Sells, S. B., 1953a
and J. R. Barry
A RESEARCH PROGRAM TO DEVELOP PSYCHIATRIC SELECTION OF FLYING PERSONNEL. II. RESEARCH PROGRESS. — Jour. Aviation Med., 24 (1): 36-47. 1953.
DLC (TL555.A1A4, v. 24)

Essentially a condensation of the report, Sells, S. B., 1952.

2079

Semenovskaia, E. N., 1953
and M. I. Struchkov
[ON THE CONDITION OF FUNCTIONAL MOBILITY OF THE VISUAL ANALYSOR IN DARKNESS AND IN LIGHT] O sostoianii funktsional'noĭ podvizhnosti zritel'nogo anlizatora v temnote i na svetu. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 8: 265-271. 1953. In Russian.
DNLM (W1.PR5815, v. 8)

The functional mobility of the visual analysor under electrical stimulation was studied by measuring the critical frequency of disappearing phosphene flashes (c.f.d.f.), the period of relative non-response (interval of excitability), the duration of retention of the rhythmical phosphene at various frequencies of eye stimulation, and the dependence of the c.f.d.f. on the duration of stimulus application. Results showed that the functional mobility of the visual analysor does not diminish under conditions of light adaptation, but increases as compared to the conditions of light adaptation. The value of the critical frequency of phosphene disappearance in the visual analysor depends directly on the strength of the stimulating current, on the duration of stimulation, and on the interval between the stimuli, in light as well as in darkness. Conditions of dark adaptation do not depress but increase the functional mobility of the visual analysor. The duration of retention of the flashing phosphene is inversely proportional to the frequency of stimulation. The excitability and

critical frequency of the visual analysor are lowered simultaneously only when the central nervous system drops into a state of inhibition (sleepiness) or if an inhibitory influence from the cortical representative of the foveal region on the projection of the peripheral parts of the retina is observed in the visual analysor.

2080

Senders, J. W. 1953
THE INFLUENCE OF SURROUND ON TRACKING PERFORMANCE. I. TRACKING ON COMBINED PURSUIT AND COMPENSATORY ONE-DIMENSIONAL TASKS WITH AND WITHOUT A STRUCTURED SURROUND. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 52-229, Part 1, Feb. 1953. iii+13 p. (RDO no. 694-39). AD 12 618 UNCLASSIFIED

Reducing the size of a visual tracking display decreased performance on pursuit tracking if the operator was required to track a continuously moving target, and this reduction in performance was due not only to the reduced apparent size of the position errors but also to the reduced rates of motion apparent to the operator. Further, a reduction in the illumination of the surround to near-or-below-threshold values also reduced tracking accuracy by making less of the rate of information contained in the display actually available to the operator. However, for almost any condition of display size and surround illumination, pursuit tracking is superior to compensatory tracking for the type of display described. Presumably, if the target input rates were so low as to be below the threshold for movement perception, then any arrangement of the display would correspond perceptually to compensatory tracking and performance would be more or less independent of surround illumination, and of the distinction between pursuit and compensatory displays. (Author's conclusion, modified)

2081

Senders, V. L., 1953
and J. Cohen
THE INFLUENCE OF METHODOLOGY ON RESEARCH ON INSTRUMENT DISPLAYS. — Antioch Coll., Yellow Springs, Ohio (Contract AF 18(600)-50); and Wright Air Development Center. Aeromedical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-93, April 1953. iv+32 p. (RDO no. 694-51). AD 16 747 PB 110995

The methods used in sixty-one studies of visual displays were analyzed and the results summarized in tabular form. In characteristic experiments subjects were presented tachistoscopic exposures of single instruments and performance was measured in terms of exposure time and errors. In planning research on visual displays, we must have some knowledge of what constitutes a good display. Nineteen criteria of the "good panel" are derived, few of which have been studied experimentally. The basic process underlying instrument use is checking the instrument presentation against the subjective probability distribution of the possible indications. The rectangular distribution of settings used in most experiments may yield distorted results because such distributions may seldom occur in practice. 64 references. (Authors' abstract)

2082

Senturia, B. H., 1953
and M. D. Marcus
ETIOLOGIC CLASSIFICATION OF DISEASES INVOLVING THE EXTERNAL EAR. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 33(038)-28643); issued by School of Aviation Medicine, Randolph Field, Tex. Aug. 1953. iii+7 p. (Project no. 21-1601-0006, Report no. 2). AD 20 377 PB 112410

Diseases of the external ear have certain peculiar features, but in general they are similar to diseases involving the skin elsewhere. An etiologic classification is attempted, but it is realized it cannot be complete at this time. The classification is based upon data from the available literature and from the authors' own experience. Much of the material is in the form of definition. References are given for those who wish further information. (Author's summary) (44 references)

2083

Senturia, B. H. 1953a
THE ADENOID PROBLEM. — Washington Univ. School of Medicine, St. Louis, Mo.; issued by School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. i+6 p. (Project no. 21-1208-0010, Report no. 3). AD 21 744 PB 112738

The adenoid offers a unique site for the development of acute and chronic infections. It responds to infection with a rapid increase in the volume of lymphoid tissue until there is a diffuse overgrowth in the nasopharynx with obstruction of the posterior nares and blockage of the Eustachian tube ostia. Contamination and stagnation of secretions of the nasal fossae occur. Inability to produce ventilation in the middle ear results in transudation. Surgical anatomy of the nasopharynx reveals a number of folds of importance and three types of cavity, depending upon the manner in which the posterior wall joins the roof. Because of the variations in structure, direct visualization of the nasopharynx aids immeasurably in removal of the obstructing adenoid tissue. Most of the instruments for direct visualization have many drawbacks. A new instrument is presented that overcomes many problems in surgery of the region. (From the author's summary)

2084

Shank, R. J. 1953
THE ELECTRONIC ASSIST. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 79-81. University of Cali-

fornia. Institute of Transportation and Traffic Engineering, Los Angeles. 1953.
DLC (TL670.C25, 1953)

Electronics can provide greater comfort, both physical and mental, for the pilot. Extended vision, hearing, and feeling may be accomplished through electronic devices. Routine tasks of memory, computation, and course control will free man to do things that no machine can do. Man will still be able to exercise his judgment. (From the author's summary).

2085

Shapot, V. S. 1952
[ON THE NATURE OF THE SPECIAL SENSITIVITY OF THE BRAIN TO OXYGEN WANT] O prirode osobo͡ĭ chuvstvitel'nosti golovnogo mozga k kislorodno͡ĭ nedostatochnosti. — Uspekhi sovremennoĭ biologii (Moskva), 34 (2) (5): 244-267. 1952. In Russian. DNLM

A review of studies on brain metabolism leads the author to the conclusion that hypoxia induces dissociation of the high-energy phosphorus compounds, i.e., a complete disappearance of adenosine triphosphate (ATF) and appearance of a small amount of adenosine diphosphate. Disappearance of ATF, or delay in its formation, directly affect the tissue's capability of respiration and glycolysis. A rapid decrease in high-energy phosphorus compounds (despite the increase in the less effective glycolysis), which reaches its limit under complete anoxia, is the most essential and decisive manifestation of disrupted brain metabolism due to oxygen hunger; it conditions the disturbance of all the other varied elements of metabolism, destroys the proteins and enzyme systems, and entails death. Hypoxia is the more pronounced in the nervous cells, the greater their energy expenditure, i.e., the higher their activity. These facts can,in a large measure, be referred to any tissue; however, the sensitivity of the brain to hypoxia is greater, due to the inability of its tissue to resynthesize macroergetic phosphorus compounds through glycolysis. The cortex and its connections with the underlying departments of the cerebrum are most affected.

2086

Shapot, V. S., 1953
I. P. Petrov, K. G. Gromova, and T. E. Kudritskai͡a
[ON THE EFFECT OF STIMULATION OF THE CENTRAL NERVOUS SYSTEM ON THE INCREASE IN SENSITIVITY OF THE ORGANISM TO OXYGEN WANT] O roli vozbuzhdeni͡a tsentral'noi nervno͡ĭ sistemy v povyshenii chuvstvitel'nosti organizma k kislorodno͡ĭ nedostatochnosti. — Fiziologicheskiĭ zhurnal SSSR (Moskva & Leningrad), 39 (5): 614-617. 1953. In Russian. DNLM

Experiments were conducted with white mice to determine to what extent stimulation of the central nervous system decreases the resistance of the organism to hypoxia. The animals were divided into the following three groups: (1) 31 controls; (2) 29 animals given phenamine (phenocoll); and (3) 32 animals subjected to additional stress by "teasing" for one hour (by preventing to seize them with open tongs) 20 minutes after the phenamine injection. The animals were then brought up to simulated altitudes of over 13,000 m. at speeds of 2000, 1000, or 250 m./minute. The results show that most of the animals in group (3) perished at a lower altitude than the controls, i.e., at 12,000 m. (controls above 13,000 m). The resistance of the organism was equally lowered in the phenamine-stimulated animals, but to a much lesser degree (maximum mortality at 12,800 m.). These facts are explained by metabolic disturbances of the central nervous system on the part of the stimulated animals prior to entering the decompression chamber. Oxygen want prevents the restoration of the central nervous metabolism to normal and increases the deficiency incurred through nervous stimulation.

2087

Shea, F. 1953
CIR CALLS FOR STRONGER CABINS. — Aviation Week, 59 (16): 98-99. Oct. 19, 1953.
DLC (TL501.A8, v. 59)

In the controversy over forward-facing versus aft-facing seats in transport planes, it is felt that there has not been enough evidence collected by investigators of air crashes to justify one in preference to the other. The crash of a DC-6 at Elizabeth, N. J., on Feb. 11, 1952, is described, and it is stated that the investigators of this accident reported that the casualty rate would have been just as high with aft-facing seats as with the forward-facing seats, which were standard on this plane. However, it is definitely recommended that seats in transports be reinforced for lateral g forces. Present seats are designed to bear only 1 and 1/2 g laterally, and it is recommended that they be strengthened to stand loads as high as 35 g laterally.

2088

Shepherd, L. R. 1953
THE POSSIBILITY OF COSMIC-RAY HAZARDS IN HIGH ALTITUDE AND SPACE FLIGHT. — Jour. Brit. Interplanetary Soc., 12: 197-212. 1953.
DLC (TL790.A1B7, v. 12)

It is estimated that under the worst conditions to be met in flight through the higher atmosphere and above, the ionization produced in tissues will be about 1/5 of that encountered by people who are exposed continuously to gamma- or X-rays in their work, such as X-ray technicians, etc. However, the tissue ionization produced by the secondary cosmic radiation is 30 times as effective as an equal amount of ionization produced by gamma- or X-ray absorption. Thus, the biological effect of tissue ionization by cosmic radiation may be dangerous for human exposure.

2089

Sherrick, C. E. 1953
VARIABLES AFFECTING SENSITIVITY OF THE

HUMAN SKIN TO MECHANICAL VIBRATION. — Univ. of Virginia, Charlottesville [Contract N7onr-372, Task Order 2]; issued by Office of Naval Research, Washington, D. C. May, 1953. [10 p.]. AD 13 859 UNCLASSIFIED

Same as the paper, Sherrick, C. E., 1953a.

2090

Sherrick, C. E. 1953a
VARIABLES AFFECTING SENSITIVITY OF THE HUMAN SKIN TO MECHANICAL VIBRATION. — Jour. Exper. Psychol., 45 (5): 273-282. 1953. DLC (BF1. J6, v. 45)

Both skin and bony tissues have natural periods of vibration. At the point of the greatest vibratory sensitivity, the conductivity of the skin is at a maximum and the mechanical impedance at a minimum. Bony tissue is more efficient in the propagation of disturbances, and has a more distinct resonance curve. The results of this study are compared with previous, often contradictory, results of earlier investigators.

2091

*Shik, L. L., 1952
A. M. Kulik, and M. G. Shneiderovich
[PECULIARITIES OF LUNG VENTILATION IN SOME FORMS OF OXYGEN WANT] Ob osobennostiakh ventiliâtsii legkikh pri nekotorykh formakh kislorodnoĭ nedostatochnosti. — In: Kislorodnaîa terapiîa i kislorodnaîa nedostatochnost'. Kiev, 1952, p. 52-53. In Russian.

On the basis of studies of non-tuberculous pulmonary diseases, especially pulmonary emphysema, the authors reject the theory according to which anoxic anoxia not caused by respiratory disturbances can be correlated with an increase of residual air. No relationship could be established between the volume of residual air and oxygen insufficiency, particularly the degree of oxygen saturation in arterial blood. Arterial oxygen saturation either remained normal during a pronounced increase of the residual air volume, or increased while the residual air volume remained constant. Measurements of residual air in healthy subjects revealed a very considerable increase in volume with age (from 700-1600 ml. in young people, to 2500-3000 ml. in elderly subjects). Considering the importance of regular ventilation to normal arterial oxygen saturation under certain pathological and physiological conditions, the authors have established a method of determining the regularity of ventilation quantitatively and qualitatively. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (17): 38. DNLM (ZW1. qS729)]

2092

Shocket, E., 1953
M. M. Jackson, and H. C. Dyme
THE EFFECT OF MODERATE ALTITUDE UPON HUMAN GASTRIC EMPTYING TIME. — Jour. Aviation Med., 24 (2): 113-122. 1953. DLC (TL555. A1A4, v. 24)

The effect of moderate [simulated] altitude (12,500 and 15,000 feet) on the rapidity of gastric emptying has been studied in seven human subjects. The rapidity of gastric evacuation was determined by several roentgenograms after the ingestion of a standard radiopaque meal. All subjects were observed twice at ground level and twice at moderate altitude. The decompression chamber employed was modified so that subjects could be roentgenphotographed without being removed from the chamber. No significant difference was found between the average emptying time at altitude and that at ground level. (Authors' summary)

2093

Shriver, B. M. 1953
AGE AND BEHAVIOR: A STUDY OF THE EFFECTS OF AGING ON AIRCREW PERFORMANCE. — School of Aviation Medicine, Randolph Field, Tex. Feb 1953. i+86 p. (Project no. 21-0202-0005, Report no. 3). AD 7497 UNCLASSIFIED

The Critical Incident Technique was used to collect reports by aircrewmen on the effects of aging which they had observed in their own performance and in the performance of other active flying personnel. The data, when analyzed and classified, indicate that impairment due to age occurs in the following five major areas: (1) Physical abilities necessary for effective performance are affected, in particular the ability to resist fatigue and excessive demands upon the organism. (2) Ability and motivation to improve in skill and technique tend to decline with age. (3) Actual job performance deteriorates particularly with respect to speed and accuracy of work and corrective action, retention of control in emergency situations, and retention of a proportionate degree of caution. (4) There is some indication that relationships with co-workers tend to become poorer. (5) Finally, motivation and adjustment with respect to the job are in general negatively affected by age. (Author's summary and conclusions)

2094

Siegel, A., 1953
and D. Courtney
DEVELOPMENT OF PRACTICAL PERFORMANCE MEASURES. — Inst. for Research in Human Relations, Philadelphia, Pa. Series 1953, Institute Report no. 4, July 1, 1953. iv+281+62 p. (2 vol.). (Contract Nonr-872(00)). AD 18 612 UNCLASSIFIED

A battery of 8 performance tests for aviation structural mechanic's rating (ASMR) was prepared on the basis of manualized procedures. Two operational squadrons were tested. Naval instructor personnel, who acted as technical consultants during the construction of the tests, served as test administrators for one squadron. In the other squadron, chief petty officers with minimal indoctrination in testing procedures were used as test administrators. Changes were made in the manualized procedures to meet the operational con-

ditions of the test. The results indicate that both the chief petty officers and technical advisors were competent. The enlisted personnel before indoctrination in testing procedures were not completely reliable but showed acceptable inter- and intra-examiner reliability after indoctrination. The chief petty officers ratings appeared adequate between and within observer reliability. The tests were acceptable from the point of view of face validity, were adequately homogeneous, and seemed to have acceptable discriminating power. (AD abstract, abbreviated)

2095

Sieker, H. O., 1952
O. H. Gauer, and J. P. Henry
EFFECT OF NEGATIVE PRESSURE BREATHING ON RENAL FUNCTION IN HUMAN BEINGS. — Federation Proceedings, 11 (1[I]): 147-148. 1952. DLC (QH301. F37, v. 11)

Following 5-hour control periods, recumbent subjects pressure-breathed at -15 cm. water for 45 minutes. Urine flow, pH, sodium excretion and filtration rate were measured. Blood pressure, pulse rate, and respiration rate were also recorded. During negative pressure breathing the urine flow showed an average increase of 350%. The urine pH during the period was unaltered, and the urine sodium concentration decreased an average 72%. The total sodium excreted during negative pressure breathing increased only 16%, and in 2 of 5 subjects, the total sodium did not increase or fell below control levels. The pulse rate, blood pressure, and respiration rate were unaltered or inconsistently changed. The inconsistent change in respiration rate, the unaltered urine pH, and the slight average increase in total urine sodium excretion make alkalosis an unlikely cause for the marked diuresis. It is suggested that the diuresis is the result of engorgement of receptor areas in the thorax which mediate changes in renal function through the endocrine glands and renal hemodynamics. (From the authors' abstract)

2096

Sieker, H. O., 1953
and J. B. Hickam
NORMAL AND IMPAIRED RETINAL VASCULAR REACTIVITY. — Duke Univ. School of Medicine, Durham, N. C. (Contract AF 33(038)-27878); issued by School of Aviation Medicine, Randolph Field, Tex. July 1953. iii + 5 p. (Project no. 21-1601-0014, Report no. 1). AD 19 695
PB 112014

"Retinal vascular reactivity" is defined as the average percent shrinkage of visible vessel diameter which occurs when a subject passes from breathing air to breathing tank oxygen. A technique is described for measuring this change by fundus photography. — Measurements of retinal vascular reactivity were made in 31 normal people. There is a slight but statistically significant decline in arterial reactivity with age. — Retinal vascular reactivity was measured in 29 hypertensive and 16 diabetic patients. In both of these groups arterial reactivity was greatly diminished below normal. A few subjects in each group showed reactivity within the normal range. — It is believed that the decrease in arterial reactivity of hypertensive and diabetic persons is the result of sclerotic changes in the retinal arteries. — Measurement of retinal vascular reactivity may prove to be a useful extension of present retinal vascular grading techniques. (Authors' summary)

2097

*Silakova, A. I. 1952
[THE INFLUENCE OF NARCOSIS AND HYPOXEMIA ON GLUTAMINE AND GLUTAMIC ACID CONTENT IN THE MUSCLES] Vliîanie narcosa i gipoksemii na soderzhanie glîutamina i glîutaminovoĭ kisloty v myshtsakh. — Ukrainskiĭ biokhimicheskiĭ Zhurnal, (Kiev), 24 (3): 354-365. 1952. In Ukrainian.

The glutamine and glutamic acid content was studied in the skeletal and heart muscles of rabbits under conditions of deep narcotic sleep or after a 4- to 5-hour exposure to a simulated altitude of 7500-8500 m. Results showed in both conditions a decrease of ammonium and glutamic acid in these muscles, an increase of glutamine in the skeletal muscles, and a decrease in the heart. During hypoxemia the average ammonium nitrogen content was 36% lower in the skeletal muscles, and 50% lower in the heart; the glutamic acid nitrogen content was 30% lower in the skeletal muscles and 40% lower in the heart. The amount of glutamine nitrogen content was increased 37% in the skeletal muscles and decreased 43% in the heart. Thus, a disturbance of the central nervous function is accompanied by a change in metabolism. The diminished intensity in metabolism, due to diminished stimulation impulses from the central nervous system during narcosis or hypoxemia leads to a decrease of the transformation process of glutamine, resulting in a decrease of ammonium and glutamic acid content, while the glutamine content remains at a higher level. The decrease of glutamine in the heart muscle may be attributed to the peculiarity of the heart metabolism, in view of the fact that this muscle differs functionally and morphologically from the skeletal muscles. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (18): 106. DNLM (ZW1. qS729)]

2098

Silver, R. J. 1952
EFFECT OF AMOUNT AND DISTRIBUTION OF WARMING-UP ACTIVITY ON RETENTION IN MOTOR LEARNING. — Jour. Exper. Psychol., 44 (2): 88-95. 1952. DLC (BF1. J6, v. 44)

Twenty-four groups of 20 subjects were given the alphabet printing task. A 10-min. rest pause was introduced after 5, 15, and 30 trials of pre-rest practice. In each of these conditions subjects were given 0, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, and $2\frac{1}{2}$ min. of warming-up activity, consisting of making tallies and crossbars. Six other groups having 15 trials of

prerest practice received 3, 4, and 5 min. of either massed or distributed warming-up activity. The subjects in all the groups received 36 trials of 30 sec. each. The results and conclusions may be summarized as follows: The subjects who received warming-up activity were significantly superior in performance on the trial following rest to those who had rest only, with no warming-up activity. The amount of warming-up activity necessary to reinstate set was found to be an increasing function of the amount of prerest practice. With increasing amounts of massed warming-up activity, there was a tendency for retention to increase up to a point and then decline. This decrease indicates that the reactive inhibition built up during the practice on the warming-up activity summated with the reactive inhibition accumulated during the practice on the main learning task. Increasing amounts of massed warming-up activity beyond a certain point did not result in a further decrease in performance. Distributed warming-up activity resulted in greater increments in performance than did massed warming-up activity. (From the author's abstract)

2099

Simmons, R. F., 1952
and N. D. Warren
MEASURING EXPOSURE TO HAZARD [Abstract]. — Amer. Psychologist, 7 (7): 390. 1952.
DLC (BF1.A55, v. 7)

The relative hazards of Air Force flying in different aircraft under different flying conditions were evaluated. Complete records of Air Force flying including the number of accidents and the conditions under which they occurred were obtained for 35 models of aircraft for each of two six-month periods. Flights and hours for these aircraft were fractionated by night, day, and instrument conditions. Accident hazard was defined as the probability of accident and was measured by the slope of the line that best predicted accidents for flying by a group of similar aircraft in a given condition. Weights from each six-month sample were applied to flights and hours of the other sample, and validity of the weighting procedure was measured by the increase in accuracy of predicting accidents. Use of this technique of measuring and weighting hazards indicates that the best estimate of a pilot's exposure to hazard is the sum of his hours and flights multiplied by weights for types of aircraft and flying conditions in which he has flown. When the weights obtained in this study are applied to a population of aircraft, weighted hours plus landings account for as much as 85% of the variance in accidents between models while unweighted hours account for no more than 50% of this variance. (Quoted in full)

2100

Simon, G. B. 1953
THE DEVELOPMENT AND TRYOUT OF A CHECK LIST OF OBSERVABLE BEHAVIORS IN PREFLIGHTING THE B-25. — Human Resources Research Center. Technical Training Research Lab., Chanute Air Force Base, Ill. Technical Report no. 53-7, April 1953. v+42 p. (Project no. 507-012-0003). AD 18 960 UNCLASSIFIED

Preflights by A & E (aircraft and engine) mechanics were observed at Air Force bases. A sample of 292 mechanics were observed in the performance of 402 preflights. Most of the mechanics were experienced and held the grade of staff or technical sergeant with an AFSC of 43260. The most important checks were considered first; 72.0% of these items were checked, while 3.4% were unobserved. The important run-up tests were done more often, while the important outside inspection checks were done much less frequently. The average percentage checked for all sections combined was 72.6. Comparisons showed that base differences for certain sections (instruments, inventory) were small, but that they were large for such sections as leaks, after run-up, run-up, and work habits. (AD abstract)

2101

Simon, S. W., 1953
and L. A. Rinard
AEROPLAST SENSITIVITY TESTS. — Jour. Aviation Med., 24 (6): 530-531. 1953.
DLC (TL555.A1A4, v. 24)

A liquid surgical dressing, Aeroplast, used for the treatment of burns, was tested on sixty patients for sensitizing properties. The plastic, with freon as a propellent, was sprayed on the back of each subject from a distance of twelve inches so that a one-square-inch area was covered. This procedure was repeated every other day for five days. In some subjects, the same area was repeatedly sprayed, in others, different areas were sprayed. No erythema, edema, or vesiculation were observed. To test for sensitization, a second treatment was given ten days following the first series; again, the results were negative. The authors' conclusion is that Aeroplast has a very low potential sensitizing capacity.

2102

Simonton, K. M., 1953
and L. D. Hedgecock
A LABORATORY ASSESSMENT OF HEARING ACUITY FOR VOICE SIGNALS AGAINST A BACKGROUND OF NOISE. — Annals Otol. Rhinol. and Otolaryngol., 62 (3): 735-747. 1953.
DLC (RF1.A6, v. 62)

The effects of masking noise on hearing acuity were investigated in subjects with normal hearing, in patients with middle-ear conduction deafness, with perception deafness, and with cochlear end-organ deafness due to Menière's disease. The experiments were carried out in the following manner: A masking noise approximating the over-all intensity and frequency characteristic of noise present in the cockpit of an airplane in flight was produced by loudspeaker. A preliminary pure-tone audiogram was made in a quiet, sound-insulated room, the test words being delivered by loudspeaker. The same test was then repeated in presence of the masking noise. The results of the test led to the following conclusions: (1) Loss of hearing due to

impaired middle-ear conduction does not reduce discrimination of speech in environments of noise. (2) Loss of hearing due to impaired perception of sound results in moderate loss of discrimination in noise. (3) In unilateral cochlear deafness, distortion due to recruitment in the poorer ear does not affect the discrimination scores from the better ear either in quiet or in noise. (4) Bilateral cochlear deafness results in severe loss of discrimination, both in quiet and in noise. (5) A favorable ratio of intensity between signal and noise is necessary for efficient hearing in noise. (Authors' conclusions, modified)

2103

Singer, D. E., 1953
B. S. McNeil, J. E. Lett, and R. B. Mitchell
OTITIS EXTERNA: FURTHER STUDIES ON THE ETIOLOGIC AGENTS AND THEIR IN VITRO SENSITIVITY REACTIONS. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. iii+6 p. (Project no. 21-1401-0005, Report no. 6). AD 25 626 PB 113325

Specimens from 145 cases of otitis externa were examined bacteriologically. Pseudomonas species appeared to be the most important probable etiologic agent. The Pseudomonas organisms isolated from cases of otitis externa throughout the period of investigation varied considerably in their reactions to the different antibiotics and other therapeutic test agents. This was also noted for other organisms. A definite increase in gram-positive coccal infections was noted during the month of September. Sensitivity studies appear to be indicated in assisting in the selection of proper therapeutic agents. (School of Aviation Medicine abstract)

2104

Singer, S. F. 1952
RESEARCH IN THE UPPER ATMOSPHERE WITH SOUNDING ROCKETS AND EARTH SATELLITE VEHICLES. — Jour. Brit. Interplanetary Soc., 11: 61-73. 1952. DLC (TL790.A1B7, v. 11)

Reasons are given why upper atmosphere research is fundamental to the successful development of space flight by humans. Thus it is essential to learn more about the hazards of cosmic radiation. Sounding rockets have helped determine that primary radiation is composed of protons, alpha particles, and stripped heavy nuclei carrying tremendous energies. This latter component is believed to present a threat to travelers in the upper atmosphere and space. Other new facts are being discovered, such as atmospheric composition at extreme altitude, ultraviolet regions of the solar spectrum, and micro-meteorites. Earth satellites will provide an additional opportunity of long periods of study of the regions now being reached by research sounding rockets.

2105

Singleton, W. T. 1952
DETERIORATION OF PERFORMANCE ON A SHORT-TERM PERCEPTUAL MOTOR TASK. — In: Ross, S., Report on "Symposium of Fatigue"..., p. 11-12. Univ. of Maryland, College Park. Technical Report no. 9 on Indicators of Behavior Decrement, April 17, 1952. (Contract DA-49-007-MD-222). AD 31 309 UNCLASSIFIED

Using an experimental situation containing a task which does not demand a very high level of mental function, it is demonstrated that a kind of "mental" fatigue can develop on a very short time scale. The operator learns to move a lever in response to a stimulus which consists of a light at a particular point on the display; there are four possible stimuli and four possible directions of lever movement. The task can be varied in difficulty by changing the relative orientation of control and display. A comprehensive record of timing and direction of movements is obtained. It is found that during trials lasting about one minute (involving 64 correct responses) there is a deterioration of performance as measured by the decision time component and, for a group of subjects, this deterioration exists within twenty seconds of the beginning of the trial. The effect vanishes after a short rest, its magnitude increases with task difficulty. The experiment is relevant to applied problems concerning manipulative skills where the operator must cease moving at times in order to assimilate further information from the environment. In this situation there can exist a kind of fatigue which does not manifest itself in the time and accuracy of the movements so much as in an increasing interval between movements. (From the author's summary)

2106

*Sirotinin, N. N. 1952
[THE INFLUENCE OF HYPOXIA ON IMMUNITY] Vliîanie gipoksii na immunitet. — In: Kislorodnaîa terapiîa i kislorodnaîa nedostatochnost'. Kiev, 1952, p. 98-101. In Russian.

A study was made on the production of antibodies and on the hemophagocytic reactions under conditions of high altitude and in the decompression chamber. Some experiments were carried out on humans, the rest on mice and rabbits. Results show that exposure to 4000 to 5000 m. above sea level does not alter the production of precipitins (in mice), and of hemolysins (in rabbits). No changes were observed in anti-body content (in humans), nor in phagocytic activity (in mice and in humans). Only a sharp drop in partial oxygen pressure, reaching almost the tolerence limit, leads to a pronounced lessening of immunogenic activity. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie Fiziologiîa (Moskva), 1953 (14): 45. DNLM (ZW1.qS729)]

2107

*Sirotinin, N. N., 1952a
and V. V. Turanov
[ON THE WORK OF THE HIGH-MOUNTAIN EXPEDITION OF THE INSTITUTE OF CLINICAL PHYSIOLOGY OF THE ACADEMY OF SCIENCES, UKRAINIAN SSR] O rabote vysokogornoĭ ekspeditsii Instituta Klinicheskoĭ Fiziologii Akademii Nauk

USSR. — Medichnyĭ Zhurnal (Kiev), 22 (4): 101-105. 1952. In Ukrainian.

Investigations were conducted on Mount Elbrus using human subjects and animals (mice) at an altitude of 4250 m. and 5000 m. A series of earlier observations regarding the state of the organism at high altitudes were confirmed, and an attempt was made to develop a prophylactic medication of mountain sickness. The author's assumption that pulmonary hyperventilation at high altitudes is controlled by cerebral centers was confirmed. Hyperventilation set in immediately after awakening. While sleeping, reading, and throughout the course of the experiment, there was a higher incidence of irregular breathing than without these conditions. With progressing acclimatization, an initially developed alkalosis disappeared. In the human subjects and, partly, in the mice, a tendency of the hemophagocytic index to decrease was noted. Examination of the higher nervous activity confirmed earlier findings that inner, and especially differentiation inhibitions occurred at high altitudes. Best results in mountain sickness prophylaxis were obtained with the so-called "acid mixture" (0.05 gm. ascorbic acid, 0.5 gm. citric acid, and 50 gm. glucose), and with Pavlov's mixture of luminal and caffein. Mountain sickness failed to occur in 75% of the subjects using both mixtures, in 63% using the "acid mixture" only, in 52% using Pavlov's mixture only, and in 21% using no medication. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa (Moskva), 1954 (17): 38. DNLM (ZW1.qS729)].

2108

*Sirotinin, N. N. 1952b
[ON THE EVOLUTION OF REACTIVITY OF THE ORGANISM] Ob evolîutsii reaktivnosti organizma. — In: Problemy reaktivnosti i shoka. Moskva, 1952, p. 8-19. In Russian.

The evolution of adaptation to oxygen want was studied throughout the whole animal kingdom, from paramecia to man. Greatest resistance to oxygen want was found at the bottom of the evolutionary ladder, with a decreasing trend upward. Active, partial respiratory adaptation to hypoxia appears first in fish. Frogs show no adaptation. Birds are very sensitive to oxygen want; waterbirds present some adaptation to anoxia during diving (apnea, slow heart beat). Hemic adaptation (increase in the number of erythrocytes and hemoglobin) exists exclusively in mammals, and is pronounced in man. The majority of mammals, including man, die at 200 mm. Hg. pressure (10,000 m. altitude) when the pressure decreases at a rate of 0.5 atm./30 min., or at 100-150 mm. Hg, if the decrease is more rapid. The first symptoms of central nervous disturbances due to hypoxia in man, begins as low as 1000-2000 m.; disturbances in the psycho-motor functions are observed at 3000 m. Increasing sensitivity to hypoxia with biological evolution has led to the development of adaptation mechanisms. Thus in man the oxygen capacity is greater than in animals. [Abstract in: Sovetskoe meditskinkoe referativnoe obozrenie, Fiziologiîa (Moskva), 1953 (16): 31-32. DNLM (ZW1.qS729)]

2109

Slack, C. W. 1953
LEARNING IN SIMPLE ONE-DIMENSIONAL TRACKING. — Amer. Jour. Psychol., 66 (1): 33-44. 1953. DLC (BF1.A5, v. 66)

Four kinds of learning in simple one-dimensional tracking of step-function inputs are discussed along with experiments demonstrating properties of various kinds: (1) The effect of initial acquaintance with apparatus and task manifests itself in some subjects as an extra-long reaction time and/or an extra-slow velocity in the initial response. This effect is typical only of the first few responses; subjects quickly settle down to a constant reaction time and to a velocity which is independent of time of presentation. (2) The range effect is dependent upon the size of the step to which the response is made. A study on individual differences yielded largely negative results. (3) Two different behavior patterns were noticed in subjects. When certain components of the response such as duration or magnitude are held constant and direction is predictable, the subject often "locks in", e.g. reduces reaction time in a regular manner. One kind of performance includes a shift in the phase relationship of the stimulus and the response which is corrected only periodically, and the other kind does not exhibit such shift. And (4) if subjects did not "lock in" or were prevented from "locking in", regularity in learning was achieved without change in performance. An attempt was made to show that a subject gains no obvious advantage from learning in either the range-effect with unpredictable step sizes or in the assumption of regularity without change in performance. (Author's summary and conclusions, modified)

2110

Sleight, R. B. 1952b
THE RELATIVE DISCRIMINABILITY OF SEVERAL GEOMETRIC FORMS. — Jour. Exper. Psychol., 43 (4): 324-328. 1952. DLC (BF1.J6, v. 43)

Twenty-one subjects were required to sort a number of geometric forms presented in a complex visual display. There were 21 kinds of figures with six of each kind. On the basis of significance of differences between sorting times, it was possible to identify four groups, in any one of which the figures were approximately equally discriminable. The most discriminable group was composed of the following forms: swastika, circle, crescent, airplane, cross, and star. A high positive correlation was found between the ranking of figures according to sorting time and ranking based on the subjects' order of selection of items according to their "attention-getting"

value. Discriminability as measured by sorting time was approximately ten times faster for the first ranking than for the last ranking figure. Of the six best figures in terms of speed of sorting time, only one or two might be considered "simple". (From the author's abstract)

2111

Smirnov, A. A., 1953
and D. A. Chetverikov
[STUDY OF PHOSPHORUS METABOLISM IN THE BRAIN DURING HYPOXIA BY MEANS OF RADIOACTIVE PHOSPHORUS] Izuchenie obmena fosfora v mozgu pri gipoxii s pomoshch'iu radioktivnogo fosfora. — Doklady Akademii Nauk SSSR (Moskva), 90 (5): 843-845. 1953. In Russian.
DLC (Q60.A52, v. 90)

The effects of diminished oxygen supply on the rate of phosphorus metabolism in the brain was studied in 13 rabbits placed in an atmosphere containing 7-8% oxygen, 1-2 days before intraperitoneal injection of radioactive phosphorus (0.5 millicuries/kg. weight of P_{32}). Twelve hours later, determination was made of : (1) the specific activity of acid-soluble phosphorus in the blood, of inorganic phosphorus in the brain (cerebral cortex and medulla), and of the phosphorus components in acid-soluble lipid and albumin brain fractions; (2) the relative specific activity of acid-soluble phosphorus in the blood and of inorganic phosphorus in the brain, expressing the rate of phosphorus metabolism. Results showed that under hypoxic conditions the rate of penetration of radioactive P into the various fractions of the brain and medulla tissue is accelerated, especially in the case of lipids. This accelerated P metabolism is mainly due to a more rapid passage of P from the blood into the brain tissue. Hypoxemia of the brain is always accompanied by increased blood circulation in the brain vessels.

2112

Smirnov, G. D. 1953
[ON THE MOBILITY OF NERVOUS PROCESSES IN THE CENTRAL AND PERIPHERAL DEPARTMENTS OF THE VISUAL ANALYSOR] O podvizhnosti nervnykh protsessov v tsentral'nom i perifericheskom otdelakh zritel'nogo analizatora. — Doklady na XIX Mezhdunarodnom Fiziologicheskom Kongresse (Moskva), 1953: 189-197. In Russian.
DNLM (W3.IN84, 1953)

The electroretinogram, the action currents in the optic nerve, and fluctuations of potential in the visual region of the cerebral cortex were studied in rabbits and frogs. A difference in the reaction to rhythmical light flashes from that to a single light stimulation appears already in the retina: rhythmical light stimulation alters the physiological parameters which determine the sensitivity of the retina, the degree of alteration depending on the rhythm. The "tuning" of the retina to a certain rhythm of stimulation is especially pronounced at the start of a series of flashings. By acting on the metabolism of the retina or the cortex one can alter their sensitivity. Hypoxia (as well as narcotics and ethylalcohol) decreases the sensitivity of the retina and the cortex. The retinal capacity to reproduce any type of rhythm is conditioned to a great extent by the functional changes induced by a preceding rhythm. Rhythmically flashing light elicits an electrical reaction in the cortex much more constant in amplitude than that of isolated single stimuli. The over-all effect upon the central nervous system of rhythmical discharges of nervous impulses depends, to a great extent, on the mobility of nervous processes in the various links of different analysors.

2113

Smith, Paul N., 1952
and D. Lewis
SIMULTANEOUS FUNCTIONING OF RETROACTIVE FACILITATION AND INTERFERENCE. — State Univ. of Iowa, Iowa City (Contract Nonr-561(00)); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Report no. SDC 166-00-3, July 1952. 2+16 p. AD 128 719
UNCLASSIFIED

The report is concerned with that aspect of transfer of training called "negative transfer" or interference. Knowing that reversed-movement training has an inhibitory effect on the original learning, the authors explored the effects of intermediate training of reversed movement on relearning the original task. Three groups of subjects, 12 per group, were tested. The first skill of the experiment to be learned was a series of arm and foot movements on a cockpit-type stick and rudder. In the midst of this training, the equipment was changed and the trainee made to learn a second skill, i.e., to make movements on the stick and rudder opposite those of the first task. When the trainee went back to the original task, he improved quickly and was better on the first skill after having undergone a great amount of training on the reversal or interference skill.

2114

Smith, Robert G. 1953
A COMPARISON BETWEEN EIGHT-WEEK AND TWELVE-WEEK BASIC TRAINING PROGRAMS.— Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Technical Report no. 53-5, March 1953. iii+4 p. (Project no. 503-004-0001). AD 14 730
PB 110668

The results of information tests and attitude scales administered during the last week of basic training were compared for 933 graduates of the 8-week program and 675 graduates of the 12-week program. The 12-week subjects had significantly higher information scores on Air Force history, organizations, and traditions; drill and ceremonies; citizenship; first aid; atomic, bacteriological, and chemical warfare; clothing and equipment; military law; and customs and courtesies. They had significantly higher attitude scores on feeling of group responsibility and enthusiasm for drill and ceremonies. The 8-week subjects had significantly higher information and attitude scores only on Air

Force career fields and on military discipline, respectively. No significant difference occurred on two information tests and four attitude scales. (AD abstract)

2115

Smith, William M. 1952a
PAST EXPERIENCE AND THE PERCEPTION OF VISUAL SIZE. — Amer. Jour. Psychol., 65 (3): 389-403. 1952. DLC (BF1.A5, v. 65)

The empirical nature of perception of visual size was investigated experimentally. Fifty-two subjects monocularly judged the apparent distance of projections of triangles and circles against reference objects observed binocularly. In the course of a two-and-one-half-week interval between tests, one part of the group manipulated objects shaped like the test objects and practiced size estimates, while the other group had no further practice. The outcome of the experiments showed the following: (1) previous experience with identical objects of greater size resulted in an increase of apparent size estimates of test objects; and (2) alterations in apparent size were in most instances interpreted as changes in distance. It is concluded that experience with objects of certain sizes and shapes effectively altered particular size-distance relationships established prior to the experience. Thus the relevance of visual size of "frames of reference" or "standards of judgment" on visual perception has been demonstrated, in support of an empirical interpretation of visual perception.

2116

Smith, William M. 1953
A METHODOLOGICAL STUDY OF SIZE-DISTANCE PERCEPTION. — Jour. Psychol., 35 (1): 143-153. 1953. DLC (BF1.J67, v. 35)

In the present experiment on the size-distance function two conditions of observation were compared: Condition N involved the matching of nearby comparison objects with more remote standard objects, and Condition R involved the matching of nearby standard objects with more remote comparison objects. White cubes were used as stimulus objects. The standard objects were two inches and four inches in size. The comparison objects varied in size in 1/4-inch intervals. The experiment was carried out in an outdoor environment. Observations under both conditions were obtained from six subjects. Three different distance values were investigated: 16 feet, 80 feet, and 320 feet. On the basis of the comparison between the two conditions of observation and the analysis of the size judgments with respect to distance the following conclusions were reached: (1) It makes little difference whether the standard object or the comparison object is varied in distance in such a study as the present one. (2) The data for both conditions showed that perceived size, as measured, increased with distance rather than decreased or remained invariant. (3) It was tentatively concluded that these results of the present study and similar results from other studies were due to errors of localization and not to an experimental artifact. (From the author's summary)

2117

Smith, Willie W. 1952a
SURVIVAL AFTER RADIATION EXPOSURE: INFLUENCE OF A DISTURBED ENVIRONMENT. — Nucleonics, 10 (11): 80-83. 1952
DLC (TK9001.N8, v. 10)

Mice and rats were exposed to whole-body X-irradiation, and radiation lethality was determined in relation to various exercises and environmental conditions. Cold increased the metabolic rate and mortality rate. Exposure for four hours to a simulated altitude of 20,000 feet had no effect on radiation lethality, in some cases even prolonged the life as compared with ground-level controls.

2118

Snyder, J. F., 1953
E. P. Hollander, N. Rosenberg, and J. T. Bair
AN APPRAISAL OF THE EFFECTIVENESS OF THE STUDENT INFORMATION TEAMS. — Tulane Univ., New Orleans, La. [Contract Nonr-47502]; and Naval School of Aviation Medicine, Pensacola, Fla. Special Report no. 53-1 (Morale Report no. 3), Jan. 5, 1953. 7+5 p. (Project no. NR 154-098). AD 76 069 UNCLASSIFIED

Naval Aviation Cadets who had just completed their final carrier qualifications were selected at random to visit Whiting, Corry, Mainside, and Saufley Fields. The essential procedure of this program was to allow cadets at these stations an opportunity to ask questions in an informal atmosphere of peers who had completed the entire program. On the whole, this procedure seemed to be effective in creating a closer feeling of "esprit-de-corps" among the cadets in attendance. The following recommendations are made: 1. That an interim program of student information teams be organized immediately along lines indicated by the pre-Christmas, 1952, visits. 2. That an overall "student information program" be set up, to accomplish four distinct (though inter-related) ends: (a) keep Naval Cadets precisely informed as to their military status at all stages of training; (b) establish communication lines between policy-making officers and cadets to keep them informed of impending changes which may affect them; (c) provide devices for recognition of progress at stages of training prior to designation; and (d) provide a more specific program to enable cadets to air their grievances, anxieties and doubts without fear of condemnation or punishment. (Authors' summary, modified)

2119

Soloyanis, G., 1953
and J. F. Corso
THE EFFECTS OF SOUND ON AUTOKINETIC MOVEMENT. — Pennsylvania State Coll., State College (Contract AF 33(038)-786); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-447, June 1953. iv+17 p. (RDO no. 695-63). AD 23 711
PB 118183

Twenty-one subjects were tested in a study to determine the effects of monaural and binaural pure tone stimulation (1000 c.p.s.) on the total magnitude and horizontal directional displacement of autokinetic movement. Eight experimental conditions (six of differential auditory stimulation, two of equal binaural stimulation) and three control conditions (pretest, within test, and post test) were used, with a total of 4620 judgments made in all. Analysis of the data through rank order and analysis-of-variance techniques showed that (a) the total magnitude of autokinetic movement is directly related to the intensity difference of the bilateral stimuli and that (b) the relative magnitude and horizontal directional displacement of autokinetic movement is predictable from the auditory stimulus conditions, with the extent of movement dependent upon the bilateral intensity difference and the direction of movement dependent upon the side of greater stimulation. In addition, it was found that (c) repeated light exposures tend to decrease the total magnitude of apparent movement. (Authors' abstract)

2120

Soulairac, A. 1952

[ACTION OF EXPERIMENTAL ANOXIA ON THE ELECTRO-CORTICAL ACTIVITY OF THE RAT] Action de l'anoxie expérimentale sur l'activité électrique corticale du rat. — Comptes rendus de l'Académie des sciences (Paris), 234 (26): 2565-2566. 1952. In French.

DLC (Q46.A14, v. 234)

The effect of anoxic anoxia on the electroencephalogram in relation to time was studied on curarized male rats. The EEG was taken directly from the anterior frontoparietal and posterior occipital cortical regions. Electrocardiograms were recorded for control purposes. Respiration was maintained by means of a tracheal pump. Anoxia was induced by interrupting pumping action in intervals. Measurements of the duration of anoxia necessary for complete cessation of cortical waves in each location and of the interval of time between resumption of respiration and reappearance of the waves gave the following results: (1) The duration of anoxia required to produce disappearance of electrical cortical activity is constant for each animal studied. (2) Electrical activity disappears more rapidly in the anterior than in the posterior cortical regions; after resumption of respiration, electrical activity reappears more slowly in the anterior than in the posterior cortex. (3) Electrical cortical activity reappears after a period of latency, which increases with the duration of anoxia. The arithmetical progression in the duration of anoxia (60, 90, 120, 150 and 180 sec.), induces a geometrical progression in the latency period preceding cortical activity (0, 20, 40, 80, and 160 sec. for the anterior, and 0, 15, 30, 60, and 120 sec. for the posterior regions).

2121

Soulairac, A., 1953
and M. L. Soulairac

[CHANGES IN THE EFFECTS OF EXPERIMENTAL ANOXIA ON THE ELECTRO-CORTICAL ACTIVITY IN THE RAT BY CORTICOSTIMULINE] Modifications par la corticostimuline des effets de l'anoxie expérimentale sur l'activité électrique corticale du rat. — Journal de physiologie (Paris), 45 (3): 521-525. 1953. In French.

DLC (QP1.J75, v. 45)

The question of corticostimuline intervention in the metabolism of the nervous system was studied in white male rats under anoxic conditions. The animals were injected 12 mg. of the drug twice, at a 14-day interval. Electrocorticograms were taken after curarization and trephination (without anesthesia); and a tracheal cannula was inserted and clamped off for total anoxia. Results showed a great influence of corticostimuline on resistance to anoxia. Thus, the time necessary for the disappearance of electrical activity in the cerebral cortex was found to be prolonged over one-third. Moreover, the relationship between the time of electrical disappearance in the anterior and in the posterior cortex in normal and in corticostimulinized animals was almost constant. After short anoxic exposures, the reappearance of cortical activity is more rapid in corticostimulinized animals than in the normals. However, if anoxia is prolonged, the latency period is no longer in the treated rats than in the normals. The cerebral metabolism itself appears altered. The authors suggest that corticostimuline may interfere in complex enzymatic processes which affect the cerebral metabolism more or less directly.

2122

Specht, H., 1952a
and H. F. Brubach

RATE OF PULMONARY NITROGEN ACCUMULATION AS AN INDEX OF LUNG TO BLOOD TRANSFER OF GASES. — Jour. Applied Physiol., 4 (7): 554-559. 1952. DLC (QP1.J72, v. 4)

During conferences held for the purpose of selecting a method of artificial resuscitation for the first aid manuals of the armed services a discussion arose over the physiological difference between compression methods, i.e., Schafer, versus expansion methods, i.e., Holger-Nielsen, Sylvester and Emerson. Data on the rate of nitrogen saturation of the pulmonary space of a single subject after nitrogen washout indicate that lung ventilation by an expansion method is more effective for blood nitrogen saturation than by a compression method as practiced here and that the difference between the two methods is statistically significant at the $P = 0.05$ level. The expansion technique more closely approximates the effects of normal breathing than that of the compression method. (Authors' summary, modified)

2123

Spencer, J. 1953

A COMPARISON OF AN AUDITORY WARNING SYSTEM WITH A CONTROLLED VISUAL WARNING SYSTEM FOR USE IN AIRCRAFT. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 818, March 1953. 8 p. TIP U71627

UNCLASSIFIED

In a previous report (Spencer, J., 1952) the results of a comparison between two types of visual warning presentation were described. In the present report the comparison is between a presentation of auditory warning information and a visual centralised panel lay-out. The latter presentation with attention-getting flashing lights is the same as that described in the paper, Spencer, J., 1952. Three warnings were used on each system, due to the fact that in this experiment the auditory warning equipment was limited to three different sounds. Ten pilots had to complete a low-level, cross-country flight in a Harvard IIb aircraft during which time they responded to warnings on both systems. The criterion adopted was the time elapsing between the onset of a warning and the completion of the correct response by the pilot. The average response time for the auditory presentation was 5.04 seconds, and for the visual presentation, 5.68 seconds, the difference between the two figures being statistically insignificant. The difference between the average range of response times for the two systems is also very small. On the basis of these results and of those from a previous experiment, a combined audio-visual warning system is considered to be worth investigating on a larger scale. (Author's summary and recommendation)

2124

Spiegel, F. S. 1953
PROBLEMS OF THE FLIGHT SURGEON IN KOREA. — U. S. Armed Forces Med. Jour., 4 (9): 1321-1324. 1953.
DLC (RC970.U7, v. 4)

Not all of the problems of the flight surgeon in Korea are associated with flying, but as a doctor he is trained and indoctrinated in all phases of aviation and military medicine. His primary mission is to maintain the flying and fighting strength of his unit. He must diligently engage in practicing field medicine and surgery, sanitation and preventive medicine, accident prevention and flying safety promotion, aviation medicine and instruction in aviation physiology; he must monitor and assist in the personal equipment program, judge morale, assist his commander in maintaining it at a high level, and supervise and train personnel in all phases of medical service. (Author's summary, modified)

2125

Spindler, T. F., 1953
and R. W. Hohl
G x TIME FLIGHT PATTERNS IN THE NAVAL AIR TRAINING COMMAND. PHASE I: ACROBATIC AND GUNNERY MANEUVERS IN BASIC TRAINING AS FLOWN IN INSTRUCTORS BASIC TRAINING UNIT. — Naval School of Aviation Medicine, Pensacola, Fla. Aug. 7, 1953. 5+11 p. (Project Report no. NM 001 059.27.01). AD 21 051
UNCLASSIFIED

The acceleration patterns in Acrobatic and Gunnery flights at the Instructors Basic Training Unit, Naval Air Station, Pensacola, Florida, were determined using Hathaway Recording Linear Accelerometers. The magnitude and duration of the g forces in these Acrobatic and Gunnery maneuvers (as flown in the Instructors Basic Training Unit) frequently exceeded the blackout threshold values as determined on the human centrifuge. This is a reasonable explanation for the high incidence of g symptoms in certain phases of Basic Flight Training. These factors and their significance in Naval Air Training are discussed. (Authors' summary)

2126

Spindler, T. F. 1953a
G x TIME FLIGHT PATTERNS IN THE NAVAL AIR TRAINING COMMAND. PHASE II AND III: ACROBATIC AND GUNNERY MANEUVERS IN BASIC TRAINING AS FLOWN BY FLIGHT STUDENTS. — Naval School of Aviation Medicine, Pensacola, Fla. Aug. 28, 1953. 5+8 p. (Project Report no. NM 001 059.27.02). AD 21 030
UNCLASSIFIED

The acceleration patterns in acrobatics and gunnery flights by students in the Naval Air Basic Training Command were determined using recording accelerometers. These student g x time patterns were higher in acrobatics than the instructors patterns (previously determined in a similar study) and, also, had much more variation particularly between the average and the high g recorded in each maneuver. The magnitude and duration of g forces in the acrobatic and gunnery maneuvers frequently exceeded the blackout threshold values as determined on the human centrifuge. The use of recording linear accelerometers in training aircraft would bring instances of excessive g to the instructors' attention immediately and would also provide graphic acceleration patterns, for each maneuver, for use in post flight discussions. The use of anti-g suits would raise the tolerance of practically all flight personnel sufficiently to eliminate blackout and unconsciousness in the Basic Training Command. This protection would increase pilot efficiency and would also contribute materially to flight safety. (From the author's summary)

2127

Spragg, S. D. S., 1952a
and M. L. Rock
DIAL READING PERFORMANCE AS A FUNCTION OF BRIGHTNESS. — Jour. Applied Psychol., 36 (2): 128-137. 1952.
DLC (BF1.J55, v. 36)

Experiments performed on healthy, dark-adapted subjects with a simulated dial panel, illuminated within a brightness range of 0.005 to 6.0 foot-lamberts, revealed a threshold brightness of 0.02 foot lamberts below which visual performance became inadequate. Increase in brightness above this level did not produce an equivalent improvement in performance.

2128

Spragg, S. D. S., 1952b
and M. L. Rock
DIAL READING PERFORMANCE AS A FUNCTION OF COLOR OF ILLUMINATION. — Jour. Applied Psychol., 36 (3); 196-200. 1952.
DLC (QP1.J72, v. 36)

The speed and accuracy of reading photographic reproductions of instrument dials illuminated with various colors and light intensities were recorded on young adult male subjects with normal vision. Brightness differences exerted a greater influence on readability than color variations. Deep red lighting (the most advantageous with regard to dark adaptation) rated low compared to the other colors used (yellow-green, yellow-orange, and orange-red). A minimum illumination of 0.02 foot-lamberts is required with red lighting to secure instrument readability.

2129

Stacy, R. W., 1953
W. V. Whitehorn, and F. A. Hitchcock
SUSCEPTIBILITY OF CATS AND DOGS TO PROGRESSIVE ANOXIA. — In: Ohio State Univ., Studies in explosive decompression ..., p. 218-223. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(w)
UNCLASSIFIED

This is the reprint of a paper which appeared in the Amer. Jour. Physiol., 153 (1): 87-92, 1948. A study was made of the respiratory and circulatory adjustments to progressive anoxia of the cat and dog. The cells of the medullary respiratory center of the cat and dog show only minor differences in the level of arterial O_2 saturation at which they cease to function. However, the cat stops breathing at a much higher inspired air pO_2 than does the dog. In the absence of the chemoreceptors, both species are less resistant to and show similar respiratory responses to anoxia. With intact chemoreceptors the dog hyperventilates to a much greater degree than does the cat. The effect of this hyperventilation on the alveolar pO_2 is the primary factor concerned in the species difference. A species difference in circulatory responses to anoxia was also demonstrated. In the intact dog, arterial pressure increases 11%, while in the intact cat it decreases 13%. When the chemoreceptors are denervated, the arterial pressure of both cat and dog decreases about 24% in response to progressive anoxia. A theoretical expression of the relation between ventilation volume and the inspired air pO_2/alveolar air pO_2 ratio is presented. (Authors' summary)

2130

Stacy, R. W., 1953a
and F. A. Hitchcock
DYNAMIC EFFECTS OF LOW OXYGEN TENSION OF INSPIRED AIR ON ALVEOLAR GAS TENSIONS. — Jour. Applied Physiol., 5 (11): 665-671. 1953. DLC (QP1.J72, v. 5)

The alveolar gas tensions were determined after reduction of the oxygen pressure of the inspired air under the following conditions: In the first experiment, 5 young male subjects inhaled air-nitrogen mixtures with the pO_2 of 77, 90 and 107 mm. When the subjects were in equilibrium with the gas mixture, they were switched back to room air. In the second experiment, the barometric pressure was suddenly lowered and the subjects were exposed to explosive decompression. The expired air was analyzed by a mass spectrometer recording pO_2 and pCO_2 simultaneously. — The following results were obtained: In the first experiment, as soon as the low oxygen mixture was inhaled, the pO_2 of the alveolar air decreased until it stabilized at a new level. The alveolar pCO_2, however, showed an initial rise followed by a decrease below the initial level. The mixing of lung gases with inspired gases in the act of breathing is a simple physical process affected only slightly by gaseous exchange. After explosive decompression (second experiment), the alveolar pO_2 was reduced as fast as that of the ambient air. The pCO_2 was at first reduced, but by the 1st or 2nd breath after the decompression, it had risen to or above the original level when the final barometric pressure was 425 or 485 mm.; when the final pressure was 555 mm., it never attained the original level.

2131

Stapp, J. P., 1953
and H. P. Nielsen
PROPOSED TESTS FOR ESCAPE FROM VERY HIGH VELOCITY AIRCRAFT. — Holloman Air Development Center, Holloman Air Force Base, N. Mex. [1953]. 11 p. AD 26 626
UNCLASSIFIED

The hazards faced by crew members when they excape from high-speed aircraft at high altitudes are described. At 15,000 ft. problems arise from the low temperature, low atmospheric pressure, tumbling and spinning, wind blast, and deceleration. The literature concerning the effect of such factors on human physiology is reviewed. In the study of the effects of deceleration on the human body, a high-speed sled, track, and water braking system are considered. (AD abstract)

2132

Stapp, J. P. 1953a
CRASH PROTECTION IN AIR TRANSPORTS. — Aeronaut. Eng. Rev., 12 (4): 71-78. 1953.
DLC (TL501.A326, v. 12)

In 1947, a tubular steel sled slipper with one to four solid-fuel rockets for propulsion was mounted on a standard gage track. Peak decelerations exceeding 100 g could thus be reproduced. Parachute dummies, chimpanzees, and human subjects were used in these experiments. Later a standard ejection seat catapult was developed which was suspended from a monorail. The carriage was decelerated by impinging against a lead cone at the end of the rail. With anesthetized pigs as subjects, motion pictures, instrument readings, and autopsy data provided the bases for analysis. Time-displacement data for human subjects are given in the paper. It was found that humans show the most severe transient physiological effects when subjected to a rate of change of deceleration of 1,370 g per sec. and a peak acceleration of 38.6 g. Protection of human occupants is limited

by such factors as dynamic stress limitations of the aircraft, relative positions of seats, specifications of life belts, and sex and age factors.

2133

Stauffer, F. R. 1953
ACCELERATION PROBLEMS OF NAVAL AIR TRAINING. I. NORMAL VARIATIONS IN TOLERANCE TO POSITIVE RADIAL ACCELERATION. — Jour. Aviation Med., 24 (3): 167-188. 1953. DLC (TL555.A1A4, v. 24)

Same as the report, Stauffer, F. R., 1952.

2134

Steer, M. D., 1953
A. I. Weiss, D. S. Green, and T. D. Hanley
UTILIZATION OF THE SONOGRAPH AS AN INSTRUMENT FOR PREDICTING THE RELATIVE INTELLIGIBILITY OF TALKERS IN MILITARY COMMUNICATION. — Purdue Univ., Lafayette, Ind. (Contract N6ori-104); issued by Special Devices Center, Port Washington, N. Y. Technical Report no. SPECDEVCEN 104-2-33, Oct. 26, 1953. 1+17+1 p. AD 45 503 UNCLASSIFIED

An instrument called the Sonograph, capable of performing acoustic analyses of voices, was used in an attempt to screen out poor talkers from those individuals who should undergo voice communication training. Sonographic analyses were made of selected words spoken by good and poor talkers. It was found that the talkers could be distinguished by the duration aspect of their speech sounds. Harmonic structure of sounds as revealed by this technique also seems to be related to intelligibility. The study indicates, however, that the Sonograph is difficult and time-consuming to use. The use of the Sonograph should be restricted to research laboratories. The instrument is not recommended for use as a screening or diagnostic device in communication training centers. (Special Devices Center summary)

2135

Stevens, K. N., 1953
W. A. Rosenblith, and R. H. Bolt
NEIGHBORHOOD REACTION TO NOISE: A SURVEY AND CORRELATION OF CASE HISTORIES. — Jour. Acoust. Soc. America, 25 (4): 833. 1953. DLC (QC221.A4, v. 25)

More than fifteen case histories involving the reaction of people in residential areas to intruding noise have been examined and correlated. In each case, statistical data on the physical characteristics of the noise (such as the level, spectrum, and time character) are examined, and the nature of the neighborhood reaction or response is described. The case histories cover a wide range of neighborhood reactions, which are arranged on a rank order scale from negligible complaints to vigorous legal action. On the basis of this experience, a scheme is suggested for predicting the reaction of a community to an intruding noise from a knowledge of pertinent physical characteristics of the noise in question and of noise to which the community has been exposed in the past. The procedure is to combine the physical properties of the stimulus into an empirical formula, from which a so-called composite noise rating is derived. The composite noise rating determines (within a range of statistical variability) the neighborhood response to the stimulus. The scheme breaks down in situations where public reaction is strongly influenced by emergencies or other stresses. (Authors' abstract)

2136

Stewart, W. K. 1953
PHYSIOLOGICAL PROBLEMS OF HIGH PERFORMANCE MILITARY AIRCRAFT. — In: The biology of flying, p. 4-7. Aeronautical Research Council (Gt. Brit.). Engineering Physics Subcommittee, London. Report no. E. P. 240, May 21, 1953. AD 23 124 UNCLASSIFIED
Also published in: Advancement of Science (London), 9 (36): 378-381. 1952.
DLC (Q41.B812, v. 9)

The principal physiological factors to be considered in modern high-speed and high-altitude flight are reviewed and their relevance with regard to airplane design is pointed out. Thus, the mechanics of respiration is of great importance, particularly in the design of oxygen equipment, cabin pressurization, and escape mechanisms. The subjective effects upon the pilot of rapid accelerations (gross fatigue, mechanical impairment of muscular function, loss of vision, loss of consciousness, and impairment of psychomotor reactions), and the objective effects (rise of arterial pressure at and below heart level, decrease of pressure at the brain and eye) may be overcome by providing the aircraft with seating arrangements offering the shortest possible distances between ankle and heart level, and heart and eye levels, within the limitations of comfort. Control of abnormal temperature gradients (up to 60°C.) and design of highly effective instrument panels and controls are further tasks facing the aviation engineer.

2137

Stewart, W. K. 1954
THE PHYSIOLOGICAL EFFECTS OF GRAVITY. — In: University of London, British Postgraduate Medical Federation. Lectures on the Scientific Basis of Medicine, v. 2 (1952-1953), p. 334-342. London: Athlone Press, 1954.
DNLM (W1. LE337, v. 2)

The physiological effects of gravity observed by pilots during changes in speed and direction of flight are: (1) loss of vision, (2) ischemia of the retina, and (3) unconsciousness and convulsions. It has been found that trained subjects can develop a relatively constant threshold with respect to ischemia of the retina; the lag period observed (3-5 sec.) after acceleration may be due to the oxidative reserve of the retina. Subthreshold accelerations may cause visual fatigue, while carotid sinus reflexes may reverse visual symptoms in some instances. Unconsciousness may result when the individual is subjected to 0.7 to

1 g above blackout threshold. The convulsions (observed in 52% of 230 subjects tested in an RCAF centrifuge) appeared to be related to unconsciousness and the subsequent restoration and reoxygenation of blood. Of particular importance is the fact that variations in thresholds of resistance to gravity were noted. The threshold range is from 3 to 9 g, when the subject is exposed to peak accelerations for 5 sec. Protection is afforded by an anti-g suit, which exerts positive abdominal-thoracic differential pressure, thus promoting venous return to the thorax. Circulation of the legs and thighs, likewise, must be controlled to aid flow into the inferior vena cava.

2138

Stickney, J. C., 1953
and D. W. Northup
RAT LD_{50} IN EXPLOSIVE DECOMPRESSION. — Amer. Jour. Physiol., 172 (2): 347-350. 1953. DLC (QP1.A5, v. 172)

The role of rate of explosive decompression has been studied in experiments on 178 unanesthetized rats decompressed within approximately 1 to less than 0.01 second from ground level to simulated altitudes between 30,000 and 71,000 feet and recompressed after 0.2 or 3.3 seconds stay at altitude. On the basis of an analysis of the percentage mortality in 136 explosive decompressions to 71,000 feet for different rates of decompression, the rat LD_{50} has been determined to occur at a duration of explosion of 0.019 second; increasing mortality rates occurred with shorter durations. These results, practically uncomplicated by anoxia, have been interpreted to indicate that mechanical effects play a major role in the lethal effects of explosive decompression at the faster rates. (Authors' summary)

2139

Stieglitz, W. I. 1953
COMPLICATED SAFETY. — Flying Safety, 9 (8): 9-11. 1953. DLC (UG633.F55, v. 9)

In order to overcome human errors resulting from increased pilot responsibility in new types of aircraft, more complicated mechanical systems must be devised. Any new instrument should be as reliable as possible. Simplification of the pilot's tasks should be the primary aim in design.

2140

Stobie, W. H., 1952
P. S. Abbott, and W. M. McClelland
THE DEVELOPMENT AND ANALYSIS OF A SECOND TEST OF RADAR SCOPE INTERPRETATION ABILITY, RSI TEST #2. — Human Resources Research Center, Lackland Air Force Base, Tex. Research Note no. AO 52-10, Dec. 1952. 9 p. (Project no. 506-006-0002). AD 9723 UNCLASSIFIED

A test of radar-scope interpretation was constructed using O-15 scope photographs and a standard flight chart. The subject's task was to identify two specified returns on each of 16 photographs in a two-hour period. Item analysis revealed that the median difficulty level was 39% and the median discrimination index (upper vs lower half on total test score) was $r_{pbis} = 0.37$. Test reliability, as estimated by the Kuder-Richardson formula 20, is 0.79. Evidences of test validity are suggestive but not conclusive. Further work on the test is considered warranted. (AD abstract)

2141

Storer, J. B., 1952
and L. H. Hempelmann
HYPOTHERMIA AND INCREASED SURVIVAL RATE OF INFANT MICE IRRADIATED WITH X-RAYS. — Amer. Jour. Physiol., 171 (2): 341-348. 1952. DLC (QP1.A5, v. 171)

The survival of infant mice irradiated while in a state of extreme hypothermia (about 5°C.) is almost twice that of litter mates exposed to the same doses of total body X-rays at room temperature. The mortality rate was not affected in infant animals less severely chilled, nor in adult mice chilled after being anesthetized. The protection afforded by extreme chilling was of about the same degree as that produced by placing the animals in a nitrogen atmosphere; furthermore, combining anoxia with refrigeration did not enhance the radiation protection. The benefit derived from extreme chilling was less if animals were placed in pure oxygen rather than in nitrogen. It is concluded that lowered tissue oxygen played an important, if not a crucial, role in increasing the survival rate of chilled infant mice. (Authors' summary)

2142

Strickland, B. A., 1953
and R. E. Nuernberger
THE TRANSITION OF THE CIVILIAN PHYSICIAN INTO THE AIR FORCE. — U. S. Armed Forces Med. Jour., 4 (9): 1291-1298. 1953. DLC (RC970.U7, v. 4)

The methods are described used in the Indoctrination Course for Officers of the Medical Service, at the Gunter Branch of the U. S. Air Force School of Aviation Medicine (Gunter Air Force Base, Alabama). This course is attended by all newly commissioned Medical Service Officers of the U. S. Air Force. The student officers spend a week of "in-processing", followed by the formal 4-week (156 curriculum hours) course. The instructional material of the course is broken down as follows: (1) duties and responsibilities of all Air Force Officers; (2) military medicine; (3) special procedures of the Air Force Medical Service; and (4) duties and responsibilities of the six technical components of the Air Force Medical Service (Medical Corps, Dental Corps, Veterinary Corps, Nurse Corps, Medical Service Corps, and Women's Medical Specialist Corps). The objective of the indoctrination course is to assist the new Air Force physicians in becoming worthy members of the medical team with the least possible delay. Reports from world-wide air bases indicate that this transition is being effectively accomplished.

2143

Stroud, M. W., 1953
J. H. Ewing, and C. L. Mack
RESPIRATORY CHANGES INDUCED IN THE UN-

ANESTHETIZED HUMAN BY THE INHALATION OF 30% CO_2. — Federation Proceedings, 12 (1^I): 140. 1953. DLC (QH301.F37, v. 12)

Using a female subject, R.M.V. (respiratory minute volume), R.R. (respiratory rate), and T.V. (tidal volume) were studied while the subject inhaled 30% CO_2 in O_2. Also, the P_aCO_2 (alveolar pCO_2) was studied. Eight exposures for 2 - 2.75 minutes gave results which were as follows: P_aCO_2 rose rapidly from 35 to 205 mm. Hg within a minute and remained almost constant during CO_2 inhalation. The R.R. curve followed the P_aCO_2 closely, increasing from 15 to 35. The R.M.V. rose more slowly from 11-36 liters in 1.25 minutes, then fell steadily to 29 liters at 2 minutes. T.V. changes paralleled those of R.M.V. with values of .85, 1.0, .80 liters, respectively. Unconsciousness occurred in one minute. After an abrupt return to air breathing, P_aCO_2 fell to 43 mm. Hg within one minute and then to 39 mm. Hg in 4.5 minutes. R.M.V. rose from 20-30 liters in 1-25 minutes after withdrawal of CO_2, then declined to 16 liters in 4.5 minutes. Corresponding values for R.R. were 28, 40, and 18, those for T.V. were .70 and .90 liters. Convulsions occurred or were accentuated during rapid decline of P_aCO_2. Conciousness returned after 3 minutes of air breathing. Thus it is confirmed that very high concentrations of CO_2 are actually depressant to respiration in man. (Authors' abstract, modified)

2144

Stroud, R. C., and H. Rahn 1952

CHANGES IN RESISTANCE TO PULMONARY BLOOD FLOW DUE TO ALTERING THE INSPIRED GAS TENSIONS. — Federation Proceedings, 11 (1^I): 155-156. 1952. DLC (QH301.F37, v. 11)

Pulmonary resistance was calculated as the pressure drop between the pulmonary artery and vein divided by the rate of blood flow. Measurements were obtained on nembutalized (28 mg./kg.) dogs with catheters in the main pulmonary artery and vein. Pressures were determined by means of saline manometers. Blood flow was measured by the Fick method. Control determinations were made while the dog breathed room air. In none of the dogs did the breathing of the test gas mixtures cause a significant change in the pulmonary venous pressure. Five dogs showed no change in resistance while for 22 dogs the calculated resistance increased 25 and 48%, respectively, breathing 8 and 15% O_2, and decreased 11% with 30% O_2. Five dogs breathing 5% CO_2-25% O_2-70% N_2 showed no significant resistance change. Three dogs which showed an increased resistance with low oxygen were sympathectomized from the middle cervical ganglia through T-9. Three weeks after the operation all failed to show an increase in resistance with low oxygen. The lack of resistance change in some of the dogs breathing low oxygen may be due to the depth of anesthesia. In unanesthetized dogs with indwelling tubes in the pulmonary artery, it was found that the pulmonary arterial pressure increased about 100% when 8% oxygen was breathed. One of these dogs had previously failed to show this response under Nembutal anesthesia. (Authors' abstract)

2145

Stroud, R. C., and H. Rahn 1953

EFFECT OF O_2 and CO_2 TENSION UPON THE RESISTANCE OF PULMONARY BLOOD VESSELS. — Amer. Jour. Physiol., 172 (1): 211-220. 1953. DLC (QP1.A5, v. 172)

Pulmonary arterial and venous pressures were obtained from anesthetized dogs by the technique of cardiac catheterization. Blood flow was measured by the Fick method. The calculated resistance to the flow through the pulmonary circuit was determined while the animals were breathing 8, 15, 21 and 30 per cent O_2 in N_2, or a mixture containing 5 per cent CO_2, 25 per cent O_2 and 70 percent N_2. It was found that the resistance increased 25 and 48 per cent as the inspired oxygen tension decreased from 21 to 15 and 8 per cent, respectively, but did not change when the carbon dioxide tension of the inspired air was raised. An attempt was made to relate these changes to actual alterations in the relative caliber of the pulmonary vessels. It appears that these changes in resistance are produced by actual vasomotion. Three dogs subjected to a two-stage transthoracic sympathectomy failed to show an increased resistance postoperatively when breathing 8 per cent oxygen-nitrogen mixture. The possible significance of these results is discussed. (Authors' summary)

2146

Strughold, H. 1953

COMPARATIVE ECOLOGICAL STUDY OF THE CHEMISTRY OF THE PLANETARY ATMOSPHERES. — School of Aviation Medicine, Randolph Field, Tex. Special Report, Dec. 1953. 6 p. AD 25 628 PB 113266

Same as the paper, Strughold, H., 1953a.

2147

Strughold, H. 1953a

COMPARATIVE ECOLOGICAL STUDY OF THE CHEMISTRY OF THE PLANETARY ATMOSPHERES. — Jour. Aviation Med., 24 (5): 393-399, 464. 1953. DLC (TL555.A1A4, v. 24)

The Earth's atmosphere is used as a reference in this discussion. Historically, the development of the Earth's atmosphere has passed through a reducing and reduced phase with no oxidizing power, through a transitional stage capable of partial oxidation and partial reduction, and then to the highly oxidized atmosphere of today. The first type of atmosphere, mentioned above, includes as similar types, the atmospheres of Pluto, Neptune, Uranus, Saturn, and Jupiter. The Martian atmosphere is an oxidized one, with a slight potential for further oxidation; vegetation of lower order may exist

there. Venus has a completely oxidized atmosphere with no potential oxidizing power. No description is given of an atmosphere for Mercury.

2148

Strughold, H., and G. Payton 1953b
THE GREEN AND RED PLANET: A PHYSIOLOGICAL STUDY OF THE POSSIBILITY OF LIFE ON MARS. — xvii+107 p. Albuquerque: University of New Mexico Press, 1953. DLC (QP82.S8565)

The possibility of the existence of life on Mars is investigated in terms of biological criteria. Environmental factors essential to life, as we conceive it (such as temperature, atmospheric pressure, light, humidity, supply of oxygen, chemical constituents of the soil, etc.), are analyzed in detail. From comparisons with analogous factors encountered on Earth, it is deduced that a lower form of life on Mars is conceivable. There is evidence of the existence of a primitive type of plants, similar to the lichens growing on our desert rocks and in Arctic tundras, and there is a chance that the "animal kingdom" is represented by such lower forms as bacteria. But any higher form of animal or plant life must be discounted. While the authors' attention is focused on Mars, other planets are studied with regard to their comparative fitness as a biological environment. This leads toward an entirely new field of biological investigation which may be called "planetary ecology".

74 references.

2149

Strumza, M. V. 1953
[TREATMENT OF CARDIAC SYNCOPE] Traitement de la syncope cardiaque. — Médecine aéronautique (Paris), 8 (2): 127-136. 1953. In French. DLC (TL555.M394, v. 8)

Experiments on cardio-respiratory reanimation were carried out on various animals. Suspension of life was performed by different methods, some inducing cardiac arrest, others respiratory arrest with secondary cardiac syncope. Inhalation of oxygen-deficient air was the preferred method, because it did not affect the cardio-respiratory centers. The process of reanimation included various operations applied simultaneously: (1) Maintenance of artificial circulation through perfusion of arterialized blood or by cardiac massage; the latter process is sometimes handicapped by the atony or contracture of the heart. (2) In cases of prolonged circulatory arrest (over 15 minutes), when the heart is lacking blood, muscular lavage (using isotonic salt solution, 1% novocaine solution, or isotonic sodium chloride solution) may be practiced; in addition, the heart beat may be restored by supplying oxygen to the coronary circulation. (3) Reanimation of a prolonged case may be complicated by ventricular fibrillation; this condition may be controlled by chemical method (injection of sodium and potassium chlorides combined) or by electric "de-fibrillation". (4) Once the heart beat is reestablished, maintenance of a stable cardiac function is important. Injections of adrenaline and analeptics combined may prevent the decrease of arterial tension. Concerning respiratory activity, none of the different analeptics proved to be effective enough to reduce the duration of apnea. Usually the time required to restore respiration is twice as long as the duration of the apnea itself.

2150

Stubbs, R. A. 1953
DYNAMIC CENTRIFUGE TRIALS OF ANTI-G VALVES. — Jour. Aviation Med., 24 (4): 334-339, 370. 1953. DLC (TL555.A1A4, v. 24)

The effects of various input pressures and ambient temperatures on the Aro M-8 and Clarke M-4 anti-g valves were investigated using wooden dummies and human subjects (wearing G-4A and G-4B anti-g suits) on the RCAF centrifuge. The valves were subjected to centrifugal accelerations of 3 to 8 g at 1 g increments. Each valve was subjected to more than 1,200 centrifuge runs. The results indicated that the Aro M-8 valve has some advantages over the Clarke M-4 valve in meeting the anti-g valve requirement of a modern, high speed aircraft.

2151

Sullivan, B. J., and L. D. De Gennaro 1953
MICROSCOPICAL OBSERVATIONS OF PERIPHERAL CIRCULATION AT SIMULATED HIGH ALTITUDES. — Jour. Aviation Med., 24 (2): 131-137. 1953. DLC (TL555.A1A4, v. 24)

Circulation in the foot web of the frog, Rana pipiens, was studied with the aid of a microscope at simulated altitudes of 60,000 and 80,000 feet produced in a bell jar. Capillaries in the distal portion of the web were the first structures to be filled with stagnated corpuscles at 60,000 and 80,000 feet; when air was supplied during decompression this process was slowed. The rate of blood flow in vessels 40-100 microns in diameter decreased, regardless of air supply. The venous system showed the decrease in blood flow before the arterial. At 80,000 feet, venous stasis occurred in 21.8 minutes without air; in 44.5 minutes with air supplied. At 60,000 feet, without air, venous stasis occurred in 106.9 minutes; with air, in 186.8 minutes. Arterial circulation was active in the proximal portion of the web at venous stasis time. It was demonstrated that oxygen is an extremely important factor in the maintenance of normal peripheral circulation at simulated high altitudes.

2152

Sumby, W. H., and F. C. Frick 1952
HOW LITTLE WE SAY [Abstract]. — Amer. Psychologist, 7 (7): 277. 1952. DLC (BF1.A55, v. 7)

Developments in information theory have suggested techniques for measuring the amount of information transferred and the redundancy prevail-

ing in ordinary written and spoken English. These measurements are influenced by the following restrictions: the physical situation and the audience limit the vocabulary, sentence structure, and subject matter, increasing the predictability of what will be said, and decreasing the informational content of what is said. This study analyzes the information transmitted by the "sub-language" used in the control of aircraft by Air Force control tower operators. The vocabulary and subject matter of this language are restricted and experimental measurement sets the redundancy at about 70%. When the situational context is taken into account, however, control tower messages turn out to be about 90% redundant. This additional redundancy can be attributed to the pilot's knowledge of the situation and the standardization of voice and operating procedures. (Abstract, modified)

2153

Sundgren, N. 1953
[RENAL CALCULI AND AIR SERVICE] Njursten och flygtjänst. — Meddelanden från flyg- och navalmedicinska nämnden (Stockholm), 2 (3): 8-10. 1953. In Swedish. DNLM (W1.SW387, v. 2)

The author cites the case of a fatal accident, in which an attack of renal colic may have caused the pilot to crash. During the period 1948-1952, 8 cases of renal calculi among 430 aviators are on record in Swedish commercial aviation. This is not an abnormal rate. All attacks except one -- in a mechanic -- occurred on the ground; and there were no indications of the possibility of a recurrence in 7 of those who had suffered attacks. In the one case where there was the possibility of recurrence the person was grounded. The others were allowed to return to their flying duties.

2154

Svetlakov, M. I. 1953
[PHOTOREGISTRATION OF BAROSENSITIVITY TESTS OF THE EAR] O fotoregistratsii issledovaniĭa barochuvstvitel'nosti ukha. — Vestnik oto-rino-laringologii (Moskva), 15 (6): 68-71. 1953. In Russian. DNLM

An apparatus was devised for the photographic recording of ear sensitivity to changes in air pressure. The effects of swallowing, of Toynbee's experiment, and of the Valsalva maneuver were recorded quantitatively in 60 subjects (39 healthy, others with ear disease). The amplitudes of the curves were found to be small during swallowing, larger in Toynbee's experiment and largest in the Valsalva maneuver. The author concludes that these measurements may be applied as an objective means of determining the barosensitivity of the ear in doubtful cases.

2155

Swann, H. G., 1953
M. Brucer, and B. R. King
ASSAY OF RESUSCITATION PROCEDURES. — Jour. Applied Physiol., 5 (8): 421-428. 1953. DLC (QP1.J72, v. 5)

An assay of resuscitation procedures has been designed. The method depends upon demonstrating the threshold of death for each procedure and then comparing the loci of the several thresholds in the process of death. Dogs breathing nitrogen were used for the tests. A positive and negative pressure respiratory pump was found to be 11 seconds superior to periodic oxygen insufflation, the margin of superiority residing in the fact that it uniformly succeeds in resuscitating at a point 11 seconds later in the process of death. Similarly, the suck-and-blow pump is 3 seconds superior to insufflation with 5 per cent CO_2 in O_2. The CO_2 at a 15% level is not superior to any of the above. Manual artificial respiration succeeded in only 19% of trials, the cause for its inadequacy being its failure to ventilate the lungs with even the minimum requirement of air. The differences shown for the three methods involving insufflation are so small that for practical purposes all three may be considered equal in efficacy. In turn, even minimal quantities of O_2, as with a single O_2 insufflation or insufflation with 2% O_2 in N_2 are equal in efficacy to all other insufflation procedures. These data reinforce the conclusion that the critical need in resuscitation is O_2 and that the method of giving it is immaterial, providing that it gets into the lungs. (From the authors' summary)

2156

Swartz, P., 1952
E. B. Norris, and S. D. S. Spragg
THE EFFECT OF CONTROL CRANK SIZE ON TRACKING PERFORMANCE. — Univ. of Rochester (Contract N6onr-241); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Report no. SDC 241-6-6, July 1952. 2+5 p. AD 128 356 UNCLASSIFIED

The purpose of this research was to determine the best size and position of a control crank to move a target follower on a two-dimensional display. Best tracking performance was obtained when the radius of controls was two to three inches. Using targets moving in a horizontal plane it was found that the best performance was obtained when the right-left control was located in front and the toward-away control was located on the right side perpendicular to the first control. In designing controls for which the torque is minimal, wheels having a radius of two or three inches should be used. Cranks should be positioned so that the plane of movement of the control crank is parallel to the line of movement resulting from rotation of the cranks. (From the authors' results and recommendations)

2157

Swartzel, K. D. 1953
A REVIEW OF THE PROBLEM OF EXTERNAL AIRCRAFT NOISE. — Aeronaut. Eng. Rev., 12 (3): 49-54. 1953. DLC (TL501.A326, v. 12)

The problems of airplane noise control may be approached from the following points of view: (1) physical measurement, (2) ear protecting devices,

(3) psychological problems, including mass psychology, and (4) political and economic considerations. Figures are presented showing sound pressure levels as a function of distance from the source (aircraft engine). A sound distribution pattern for a jet aircraft is included. Loudness-level contours and a loudness chart for octave-band measurements of complex sounds are also given. Control of noise may be effected by silencing at the source, isolating airports by zoning, observing more careful operational procedures, and protecting the ear. Sound economic principles should guide all actions.

2158

Sweet, A. L. 1953
TEMPORAL DISCRIMINATION BY THE HUMAN EYE. — Amer. Jour. Psychol., 66 (2): 185-198. 1953. DLC (BF1.A5, v. 66)

The temporal sensitivity of the human eye was measured by discriminations between two seperate lights which flashed at different temporal intervals. Measurements were made at different retinal positions with dark- and light-adaptation. Two procedures were used. (1) Two lights, separated in space, were used: one light stimulated the fovea and the other either the fovea, or a spot 5°, 10°, 20°, or 40° on the nasal retina of the right eye; (2) two lights, placed tangentially adjacent to each other, together stimulated the right eye at each of the positions mentioned. For each of these conditions, the subject judged whether the two flashes were "similar" or "different" in time as the difference in the time of onset of the two flashes was varied. The major findings are as follows: (1) The latency of reaction in the periphery is greater than at the fovea. The amount of peripheral lag was, in general, of the order of 5-25 milli-seconds. (2) Variability among individuals in judging the point of temporal equality between two lights separated in space was marked. The variablity was much less when the lights were adjacent. (3) At the fovea, for either the light- or dark-adapted eye, the just noticeable interval of time between two adjacent flashes was approximately 5 m. sec. (4) In the light-adapted periphery, a highly precise discrimination of adjacent flashes occurred when movement was perceived by itself, independently of any spatial resolution of the two lights. When the criterion required seeing two separate lights flashing at different times, the thresholds were much higher. (5) The perception of movement was more precise in the periphery than at the fovea. (From the author's summary and conclusions)

2159

(Symposium on Aircraft Noise) 1953
SYMPOSIUM ON AIRCRAFT NOISE: A SERIES OF PAPERS ON THE GENERATION, PROPAGATION, AND CONTROL OF AIRCRAFT NOISE, PRESENTED DURING THE MEETING OF THE ACOUSTICAL SOCIETY OF AMERICA AT SAN DIEGO, CALIFORNIA, NOVEMBER 13-15, 1952. — Jour. Acoust. Soc. America, 25 (3): 363-442. 1953. DLC (QC221.A4, v. 25)

The following papers presented at this symposium have been abstracted separately:
Bolt, R. H., 1953
Gierke, H. E. von, 1953b
Hazard, D. M., 1953
Hubbard, H. H., 1953
Powell, A., 1953
Veneklasen, P. S., 1953, 1953a

2160

Tabusse, L. 1953
[PULMONARY TUBERCULOSIS IN AVIATION PERSONNEL] Tuberculose pulmonaire du personnel navigant. — Médicine aéronautique (Paris), 8 (2): 109-118. 1953. In French.
DLC (TL555.M394, v. 8)

The relationship between pulmonary tuberculosis and flying is discussed. In analyzing the case histories of subjects suffering from tuberculosis and exposed to flying it was observed that (1) exposure to altitude aggravated dormant bacillary lesions; (2) one flight trip usually had no effect, but it was recommended that frequent plane trips be banned in latent cases; and (3) occasional flight trips of patients (in case of emergency) should be carried out under close medical supervision. --- Patients with calcified pulmonary lesions were exposed to the simulated altitude of 40,000 ft. after inhaling oxygen for 30-40 minutes. The experiment was repeated a few times for several months. Hemoptysis and bacillary expectoration were noted in some of the patients. ---Factors prevalent in flying may induce tuberculosis in previously healthy subjects. Prolonged fatigue, so decisive in the development of tuberculosis in aviators is due to: (1) physical factors (atmospheric conditions, decrease of partial pressure of oxygen, variations of temperature and humidity, etc.); (2) psychological factors (anxiety over engine failure, etc.); and (3) the pathophysiology and local fatigue of the lung at altitude manifesting itself in symptoms as pulmonary hyperventilation, vascular congestion, liberation of gas bubbles in the blood, and effects of cold.

2161

Taylor, C. L., 1953
and K. Buettner
THE EVAPORATIVE EFFECT ON HUMAN PERSPIRATION. — Univ. of California, Los Angeles (Contract AF 33(616)-32); issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-345, Sept. 1953. iv+28 p. (RDO no. 696-69). AD 25 502 UNCLASSIFIED

Evidence for an "evaporative effect" upon human perspiration has been obtained from four series of experimental data. Plots of skin water losses against average skin temperature, using results from human experiments under conditions of altered temperature, humidity, air movement and air pressure reveal that significant residual evaporation is associated with these environmental influences. Since the direction and magnitude of these effects are such as to increase or decrease evapo-

ration from the skin, the phenomenon has been designated as the "evaporative effect". Explanation for the "evaporative effect" has been sought in skin water transfer not involving sweat gland participation. This brings attention to the processes of diffusion (insensible) losses, skin water storage shifts, and to the much less completely understood processes of penetration, repenetration and osmotic regulation of the human skin. (Authors' abstract)

2162

Taylor, D. W. 1953
EFFECTS OF VITAMIN E DEFICIENCY ON OXYGEN TOXICITY IN THE RAT. [Abstract] — Jour. Physiol. (London), 121 (2): 47P-48P. 1953.
DLC (QP1.J75, v. 121)

Twenty-eight rats were divided into two groups each containing eight males and six females. Both were from time of weaning given the same basic artificial diet with 20% casein and designed to contain negligible amounts of vitamin E. Animals in group A were given in addition 5 mg. α-tocopheryl acetate orally twice weekly. When 9 months old, all were exposed to 5 atm. of oxygen (approx. 98% O_2) for a standard period of 50 min., during the whole of which they were under direct observation. In group A convulsions were observed in only four animals, while all fourteen in group B convulsed. In group A only one animal died, but in Group B there was only one survivor. Both these differences are highly significant ($P < 0.01$ and 0.001 respectively). Autopsy was performed on all animals to assess lung damage. The overall difference was not significant. There was no macroscopic or microscopic liver damage. There seems to be no immediate fundamental explanation of these results other than such a postulate as enhanced toxicity from some abnormal metabolite formation, or increase in normal cell metabolism, in the absence of vitamin E, known to be a tissue anti-oxidant.

2163

Taylor, J. A., 1952
and K. W. Spence
THE RELATIONSHIP OF ANXIETY LEVEL TO PERFORMANCE IN SERIAL LEARNING. — Jour. Exper. Psychol., 44 (2): 61-64. 1952.
DLC (BF1.J6, v. 44)

This study was concerned with the investigation of the relationship between learning and anxiety level. Twenty subjects, each with a high degree of manifest anxiety, were compared with twenty subjects who had low individual levels of manifest anxiety, utilizing the learning device of the memory drum. In this test the subject is required to anticipate whether the correct response is to the left or the right when he is confronted with a continuous white tape which bears the words, "right" on the right side and "left" on the left side of the tape, arranged in a patterned sequence. The criterion selected for learning was two successful runs during which the subject correctly anticipated the correct response at each choice point. It was found that the anxious individuals made a significantly greater number of errors than the less anxious ones, and that they also required a larger number of trials in order to successfully pass the test. This difference between the two groups of subjects was manifest especially at those points where the greatest difficulty of choice resided.

2164

Teel, K. S., 1953
and P. H. DuBois
PERSONNEL AND SITUATIONAL FACTORS IN AIRCRAFT ACCIDENTS. CONFERENCE PROCEEDINGS, FEBRUARY 15-16, 1953. — Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum no. TN-54-3, Sept. 1953. vi+95 p. AD 49 790
PB 117036

Discussions on the relationship of pilot error to situational factors are reviewed. These discussions took place at a conference sponsored jointly by the Human Factors Operations Laboratory and the Medical Safety Division of the Directorate of Flight Safety. The participant speakers reviewed and discussed research tasks performed by their respective laboratories, among others, the following: accident proneness as related to situational factors, pilot stanine tests as accident predictors, the relationship between accidents and flying experience, aircraft maintenance and jet airplane, and check-out inspection procedures. Overall aspects of research in this field were outlined and future tasks indicated.

2165

Tenney, S. M., 1953
H. Rahn, R. C. Stroud, and J. C. Mithoefer
ADAPTION TO HIGH ALTITUDE: CHANGES IN LUNG VOLUMES DURING THE FIRST SEVEN DAYS AT MT. EVANS, COLORADO. — Jour. Applied Physiol., 5 (10): 607-613. 1953.
DLC (QP1.J72, v. 5)

The lung volumes of four subjects during a 7-day stay at 14,250 feet have been studied, and the following trends observed. The vital capacity decreased during the first 3 days, then progressively increased in all subjects and exceeded sea level values in two subjects. The residual volume increased the 1st day, then fell during the next 4 days and had leveled off by the end of the week so that three subjects were above control values, and one subject was just at sea-level value. The total capacities were high initially, but by the end of the week two subjects had total volumes above those at sea level and two below. The expiratory reserve volume increased progressively in all subjects over the first 6 days. Breathing oxygen in all four subjects and continuous positive pressure breathing in two subjects failed to increase the vital capacity. Certain implications of the lung volume changes, particularly as concerns pulmonary blood volume changes, are discussed. (Authors' summary)

2166

Thetford, P. E., and F. E. Guedry 1952a

THE POSTURAL VERTICAL IN UNILATERALLY LABYRINTHECTOMIZED INDIVIDUALS. — Tulane Univ., New Orleans, La. (Contract N7-onr-434, Task Order 1); and Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 063.01.26). Joint Progress Report no. 26, June 1, 1952. 6 p. ATI 159447 UNCLASSIFIED

Five female subjects with only one functioning labyrinth were tilted 20 degrees right and left under conditions of delay (45 seconds) and no delay in the tilted position. These tests occurred at least one year after the unilateral labyrinthectomy. Displacement of the postural vertical in the direction of the injured side was not exhibited by these subjects. Within the limits of this study, the results indicate that subjects with only one functioning labyrinth respond to delay in a tilted position about the same as normal subjects. Adaptation to tilt was not specific to the unimpaired side. (Authors' summary and conclusions)

2167

Thomas, G. J. 1953

VOLUME AND LOUDNESS OF NOISE. — Amer. Jour. Psychol., 65 (4): 588-593. 1952. DLC (BF1.A5, v. 65)

It was found the subjects all easily and consistently able to equate in volume various bandwidths of 'white' noise. The equal-volume equations differ consistently from equal-loudness matches of the same stimuli. Less overall intensity in a given wide band of noise is required to match it with a central, narrow band in respect of volume than is required to match the same stimulus in respect of loudness. Apparently, if the overall level of the various bands of noise were held constant, as the bandwidth was increased, volume would increase at a greater rate than would loudness. When a tone of 1000 cycles per second is matched with a band of noise, the judgments are more difficult and more variable, and the difference between equal volume and equal loudness is less consistent. (From the author's summary)

2168

Thompson, M. E., J. P. Thompson, and E. R. Dusek 1953

TESTS OF MOTOR ABILITY OR GROSS MUSCULAR COORDINATION. — Univ. of Arkansas, Fayetteville (Contract AF 33(038)-22948); issued by Human Resources Research Center. Perceptual and Motor Skills Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-25, July 1953. iii+35 p. (Project no. 509-020-0005). AD 20 372 UNCLASSIFIED

An evaluation was made of physical education tests developed since 1925, such as the General Motor Ability Test, the Springfield Muscular Efficiency Test, the Springfield Motor Ability Test, the Inventory of Motor Fitness, the Illinois Motor Fitness Screen Test, the Short Classification Test of Motor Fitness, the Indiana Motor Fitness Tests, and the Jump-Chinning-Run (JCR) Test. The existing tests were considered satisfactory for sectioning physical education classes and for assessing the physical education needs of the high school or college student. The need was emphasized for the development of a motor ability test which could be administered quickly to naive subjects and scored objectively by unsophisticated administrators.

255 references.

2169

Thorndike, R. L. 1952b

FIELD TRY-OUT OF THE EXPERIENCE RECORD AS AN AID TO CAREER GUIDANCE. — Columbia Univ. [Teachers College], New York. (Contract AF 33(038)-13474); issued by Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-21, June 1952. 6 p. (Project no. 510-022-0001). ATI 159 246 UNCLASSIFIED

During January and February 1952, a trial was made at Lackland Air Force Base to evaluate Form X-3 of the Experience Record, filled out by the airmen, as an aid in career guidance. A tabulation was made of the career guidance interviewer's recommendations as related to the experience shown on the record blanks. These tabulations were analyzed with the purpose of determining whether the recommendations to career fields were more closely related to the civilian experience of the airman when the counselor had the results of the Experience Record before him than when he obtained this information on civilian experience from the interview only. The majority of the counselors felt that the Experience Record was most useful for giving guidance. However, there was no clear evidence that the availability of the Experience Record affected the counselors' final recommendations.

2170

Tiffin, J., G. E. Miller, and W. B. Chew 1953

THE DEVELOPMENT AND EVALUATION OF METHODOLOGY FOR ESTABLISHING VISUAL REQUIREMENTS FOR NAVAL PERSONNEL. — Purdue Univ., Lafayette, Ind. (Contract N7onr-39423); issued by Bureau of Naval Personnel. Personnel Analysis Div., Washington, D. C. Technical Bulletin no. 53-7, Oct. 27, 1953. xvii+158 p. (Project no. NR 152 129). AD 24 117 PB 114299

The methodology was developed which provides a feasible means of establishing visual requirements for battle-station assignments. The methodology consists of determining the relationship between performance of subjects on a job-sample test and various levels of artificially induced vision. To evaluate the methodology a job-sample test was constructed and the relationship between performance and near visual acuity was determined by rather complex statistical procedures and also by simple graphical procedures. As a result of the research conducted, the proposed methodology ap-

pears to provide a means whereby visual requirements can be rapidly and efficiently established. It was further found that visual standards established for a particular job under given lighting and working conditions would not necessarily be valid for other jobs and/or other lighting and working conditions. (From the authors' summary)

2171

Timofeev, N. V., and K. P. Pokryvalova 1953
[AGE-INDUCED CHANGES OF AUDITORY THRESHOLDS FOR BONE CONDUCTION] Vozrastnye izmeneniia porogov slyshimosti pri kostnoĭ provodimosti. — Vestnik oto-rino-laringologii (Moskva), 15 (1): 31-33. 1953. In Russian. DNLM

Auditory thresholds for bone conduction were studied in 125 subjects 7 to 79 years of age, whose auditory thresholds were normal for air-borne sounds. Sound stimulation was applied by means of an electromagnetic and a piezoelectric vibrator at frequencies of 100-12,000 c.p.s. No difference in thresholds was obtained by the two different vibrators in the age groups from 7 to 39 years; a slight difference was observed in the age groups from 40 to 59 years; and a very noticeable difference in the groups from 60 to 79 years. Deterioration of hearing was manifested almost identically in both types of stimulation. The thresholds for bone conduction are moreover limited to high frequencies of 8000-10,000 c.p.s. The difference in auditory thresholds as related to age is greatest at 8000 c.p.s. (55-62 decibels) and least for 100 c.p.s. (9-10 decibels). The cause of auditory deterioration with age for bone conduction is seen in neurotropic damages of the auditory analysor structure.

2172

Tobias, C. A. 1953
RADIATION HAZARDS IN HIGH ALTITUDE AVIATION. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 21-41. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Same as the paper, Tobias, C. A., 1952.

2173

Tolhurst, G. C. 1953
LOCALIZATION ACCURACY RESULTING FROM ISOLATED BINAURAL STIMULATION. — Ohio State Univ. Research Foundation, Columbus. (Contract N6onr-22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.15). Joint Report no. 15, Jan. 5, 1953. 8+7 p. AD 2595 UNCLASSIFIED

Two hundred and five observers in groups made judgments of apparent azimuth of five different types of sound stimuli heard over a dual-channel stereophonic system. In the adjacent control room the microphones were mounted on a turntable capable of being rotated through 360 degrees and separated to simulate intra-aural distance. This had the effect of being able to "rotate" an observer 360 degrees in relation to a single sound source, or to "rotate" the sound source around the individual through 360 degrees. The observers indicated by a vector arrow the direction from which the sounds appeared to come. The analysis of the data indicate the following: (1) The observers were unable, significantly better than by chance, to localize in azimuth within a full quadrant of ± 45 degrees the five types of stimuli; however, the observers were able to localize music within a quadrant better than chance responses. (2) Subjects were unable to localize one of the sounds used as stimuli significantly better than any of the others. (3) Within ± 90 degrees the observers were able to localize some of the stimulus sounds significantly different than others. And (4) sixteen percent of all responses made were 180 degrees away from the stimulus sounds.

2174

Tolhurst, G. C., and S. N. Morrill 1953a
FLIGHT DECK NOISE-EXCLUSION PERSONNEL HELMET (FDPH) EVALUATION. — Ohio State Univ. Research Foundation, Columbus (Contract N6onr-22525); issued by Naval School of Aviation Medicine, Pensacola, Fla. (Project Report no. NM 001 064.01.16). Joint Project Report no. 16, May 7, 1953. 7+19 p. AD 19 388
PB 112069

Eight Flight Deck Noise-Exclusion Personnel Helmets (FDPH) were evaluated as to their noise attenuation characteristics under three general sound conditions: (a) the total audible frequency spectrum at each frequency in the spectrum, (b) 124 db. of JRB noise recorded in the cockpit at the co-pilot's right ear with the window open, and (c) 124 db. of American Standards Association (ASA) "white" noise. A plaster dummy head was fitted with a miniature condenser microphone within the head and whose opening to the outside simulated the external auditory meatus. The microphone diaphragm was in the approximate position of the ear drum. The frequency response curves were made with the head in a position in front of the loudspeakers and then with a helmet on, the head remaining in the same position. Attenuation values, when the ambient noise was the JRB or ASA white noise, were obtained using the above procedure. (Authors' summary)

2175

Tomatis 1953
[OCCUPATIONAL DEAFNESS] La surdité professionnelle. — Médecine aéronautique (Paris), 8 (3): 201-240. 1953. In French.
DLC (TL555.M394, v. 8)

Occupational deafness encountered among workers of industrial work-shop test benches is discussed. A total of 1,295 workers exposed regularly to excessive noise were subjected to a series of audiometric tests. Two groups were distin-

guished: in the first group the maximum intensity of noise exposure was 112-120 db., with an average exposure time of 10 minutes per working hour; in the second group the corresponding data were 125-135 db. and a consecutive 10 hours working period. In the pathogenesis of occupational deafness, four periods can be distinguished: (1) There are usually 3-4 weeks of habituation to extreme industrial noise; after this period, a hearing loss of about 40 db. is evident in subjects having a predisposition to auditory impairment. (2) In the period of total latency, the audiogram reveals a slowly progressing impairment, though deafness is not apparent because speaking voice (up to 2048 c.p.s.), even whispering can be heard from a distance of 6 m. (3) In the following period of subtotal latency, the subject has no difficulty in following conversation, but he does not perceive whispering and does not hear beyond a distance of 3 m. and below frequencies of 1024 c.p.s. The duration of this period varies and is conditioned by the susceptability of the individual. (4) In the terminal period, sounds under 512 c.p.s. are not perceived; conversation is followed with difficulty and deafness is evident. Certain individual factors, such as susceptibility, age (especially important after reaching 40), and previous latent deficiencies of the ear have to be taken into account.

2176

Tomlinson, R. M., 1952
T. R. O'Malley, and Robert Schmidt.
STUDY OF CONTACT FLIGHT TRAINING. — Richardson, Bellows, Henry and Co., Inc., New York (Contract Nonr-38305); issued by Special Devices Center, Port Washington, N. Y. Human Engineering Report no. SDC 383-5-2, July 15, 1952. 5+48 p., 12 plates. AD 128 357
UNCLASSIFIED

Training methods and principles of contact flight are discussed. The complex learning task may be divided into separate units which are eventually integrated into a total "skill pattern". These skill areas, which are individually analyzed, are the following: (1) learning "nose attitudes" of the plane in elementary and precision maneuvers; (2) learning to judge altitude and distance over a field or runway; (3) learning to change "heading" by rolling in and out of turns; (4) learning to maintain balanced flight; and (5) learning complex procedures. This division of tasks should be applied trainingwise by making it the basis for the development of devices and for the modification of associated training procedures. Training by skill areas eliminates trial and error processes and secures increased learning capacity from maneuver to maneuver. Paramount in the training of contact flight is the conditioning of the trainee to visual cues. A group of "part trainers" are described on which these individual tasks can be practiced.

2177

Tonndorf, J. 1953
SOME IMPLICATIONS OF THE DECIBEL SCALE — School of Aviation Medicine, Randolph Field, Tex. Special Report, Feb. 1953. iii+7 p. AD 7601
UNCLASSIFIED

Limitations of human hearing are discussed in terms of the decibel scale; steady pressure equivalents and corresponding ranges of weight and length are given in units of everyday use. The total sound power developed by an F-80 jet airplane is approximated and related to power consumption and thrust (15.7 kilowatt, or 0.06% of the total power produced). (Author's summary, modified)

2178

Tonndorf, J., 1953a
and F. A. Brogan
SHORT-DURATION AUDITORY FATIGUE AFTER WHITE-NOISE STIMULATION: DEVELOPMENT OF A ROUTINE TEST PROCEDURE. — School of Aviation Medicine, Randolph Field, Tex. Feb. 1953. iii+14 p. (Project no. 21-1203-0001, Report no. 3). AD 7602 UNCLASSIFIED

A test method is described which employs short-duration (2 sec.) exposure to intense (110 db.) white noise. The ensuing threshold shift was determined for click, white-noise, and pure-tone signals (probes) at various intervals after exposure. Evaluated from the results were: the initial threshold shift after stimulation (shortest interval, 25 msec.), the pattern of the return to the resting level, and the trend of an aftereffect which begins to appear approximately 1,000 msec. after stimulation. This aftereffect consisted either of a threshold improvement or a secondary drop. Results on a small group of trained listeners, as well as on larger groups of untrained subjects, indicate that the procedure is applicable for routine testing and that the combination of white-noise stimulation and click probes may yield more significant information as to differentiation of subjects than other combinations.

2179

Tonndorf, J. 1953b
COMBINED EFFECT OF NOISE AND HYPOXIA UPON THE AUDITORY THRESHOLD. — School of Aviation Medicine, Randolph Field, Tex. March 1953. iii+9 p. (Project no. 21-1203-0001, Report no. 1). AD 7495 UNCLASSIFIED

Laboratory experiments on human subjects were carried out in order to determine the combined effect, during and after stimulation, of noise and hypoxia upon the auditory threshold. Hypoxia was found to enhance the effect of noise as to masking, auditory fatigue, and the overshooting aftereffect frequently observed during the period of restitution. The fact that variations in oxygen supply affect the masking threshold, while additional peripheral impairment (auditory fatigue) fails to do so, indicates that hypoxia acts upon the auditory system at a level centrally in relation to the cochlea. This central effect of variation in oxygen supply may completely mask a similar, but weaker peripheral effect. The results observed

during the poststimulatory phase cannot be interpreted as indicating that hypoxia will affect the incidence of acoustic trauma. In all cases of peripheral impairment (conductive and perceptive), the individual masking curve was found to join the normal curve at high levels of noise. Failure to do so was described as incomplete recession. This phenomenon is now explained to indicate true nerve-type hearing impairment. (From the author's summary)

2180

Tonndorf, J., 1953c
R. W. Hyde, H. I. Chinn, and J. E. Lett
ABSORPTION FROM NASAL MUCOUS MEMBRANE: SYSTEMIC EFFECT OF HYOSCINE FOLLOWING INTRANASAL ADMINISTRATION. — School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+6 p. (Project no. 21-1208-0010, Report no. 2). AD 19 663 PB 112052

Intranasal medication with hyoscine as drops and as spray was compared with oral and subcutaneous administration. Using the relative decrease in saliva production as an indication, hyoscine was shown to be more rapidly, completely, and uniformly absorbed intranasally than orally. Drops were superior to the spray. The addition of a detergent to the hyoscine spray markedly improved its activity, presumably by allowing penetration of the mucous layer. — Neosynephrine given intranasally before hyoscine administration decreased the hyoscine effect. — The action of vasoconstrictors in hindering absorption is discussed. The following recommendations are made: (1) that an improved spray bottle be perfected to allow more accurate and uniform delivery of the drug; (2) that hyoscine by intranasal route be tested against motion sickness; and (3) that this method be tested for the administration of other drugs in which systemic effects are desired. (From the authors' summary)

2181

Torr, D. V. 1952
A FACTOR ANALYSIS OF SELECTED INTEREST INVENTORIES [Abstract]. — Amer. Psychologist., 7 (7): 296. 1952.
DLC (BF1.A55, v. 7)

The factorial content of a correlation matrix of interest inventories considered as representative of available interest measures was determined in 594 airmen undergoing basic training. Four-factor intercorrelations were obtained for 49 variables including those from the Thurstone Interest Schedule, Guilford-Schneidman-Zimmerman Interest Survey, Brainard Occupational Preference Inventory, Lee-Thorpe Occupational Interest Inventory, Texas Occupational Interest Analyzer, Biographical Inventory after Sims, and the Masculinity-Femininity scale of the Strong Vocational Interest Blank for Men. Of the twelve factors extracted, four factors did not have a sufficient number of significant loadings. After rotation six factors were given tentative definition as "interest in mechanics," "interest in people," "interest in esthetics," "interest in science," " interest in nature," and "interest in business." Two additional factors were uniquely determined by variables from two separate inventories, factor V by the Interest Schedule and factor VIII by the Interest Survey.

2182

Torrance, E. P. 1953
CREW PERFORMANCE IN A TEST SITUATION AS A PREDICTOR OF FIELD AND COMBAT PERFORMANCE. — Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memo Report no. 33, March 1953. 43 p. AD 14 473 PB 113177

Group problem-solving tests, group-interaction picture-story tests, and group squares tests were administered to air crews in the Strategic Air Command Survival School. Twenty good and 20 poor crews were differentiated by instructor ratings; the test performances of the good crews was characterized by better manpower utilization, better crew coordination, fuller participation and control, a higher degree of flexibility, and greater success in problem-solving. The good crews more frequently expected a satisfactory outcome, an orderly and productive functioning of the crew, and harmonious crew relationships, and they less frequently expected status differences within the crew. Members of good crews accepted more fully the crew's decision. The test performances of 51 B-29 combat crews were compared with crew effectiveness in actual combat as measured by officer rating and percentage of successful missions. The results obtained with the combat crews were similar to those obtained with the survival crews. Twenty drop-out crews were rated lower than the combat crews on all five of the test performance ratings. The preliminary use of crew performance tests in the training of crews was undertaken. (AD abstract)

2183

Torrance, E. P. 1953a
PSYCHOLOGICAL ASPECTS OF SURVIVAL. — Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Report no. 35, March 1953. iii+29 p. AD 7860 PB 109600

Information on the psychology of survival compiled from literature sources is presented concerning: (1) physiological and psychological manifestations of fear and factors which minimize fear; (2) psychological reactions to other states unfavorable to survival, namely, pain, cold, hunger, thirst, fatigue, boredom, and loneliness; (3) problems of group behavior under survival conditions; (4) personality requirements for survival; and (5) the meanings of psychological set and conflict for survival. Present knowledge of survival is discussed, and recommendations are made for further study. 68 references. (AD abstract)

2184

Torrance E. P. 1953b
SURVIVAL PSYCHOLOGY: SOME THINGS THE

COMBAT AIRCREWMAN SHOULD KNOW ABOUT THE PSYCHOLOGICAL ASPECTS OF SURVIVAL. Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memorandum no. 42, Dec. 1953. 42 p. AD 25 664
PB 113191

A booklet containing survival principles was developed to aid air crewmen in meeting mental and emotional problems arising under emergency conditions. The survival experiences of AF personnel during World War II and the Korean conflict provided a basis for the formulation of practical steps for avoiding or solving survival problems. The principles are accompanied by typical examples quoted from actual survival reports and suggestions for application of the principles. (AD abstract)

2185

Tozer, E. 1953
INSTRUMENT PANEL LIGHTING. — Skyways, 12: 13, 54-55. April 1953.
DLC (TL501.S634, v. 12)

The physiological and psychological problems involved in viewing panel instruments during flight are discussed in a general manner. Various engineering techniques employed in order to redesign and correct the lighting of panel instruments for maximum flight safety are mentioned. Physiological studies of eye responses to various intensities and wavelengths of light have prompted new systems of panel illumination. Redesign of instrument panels and/or dial markings would increase the pilot's efficiency in instrument reading.

2186

Trebra, P. von 1952
and Karl U. Smith
THE DIMENSIONAL ANALYSIS OF MOTION. IV: TRANSFER EFFECTS AND DIRECTION OF MOVEMENT. — Jour. Applied Psychol., 36 (5): 348-353. 1952. DLC (BF1.J55, v. 36)

A new systematic point of view, along with pertinent specific principles, has been described for the applied and theoretical study of motion. Special new techniques, implementing these principles, have been used in this investigation of transfer of learned movements from one direction of motion to others. Learning data indicate that, for different directional patterns of motion, the travel component on the pattern shows limited and inconsistent changes with practice, whereas the manipulative component of the pattern displays uniform progressive change throughout the eight days of training. These data are consistent with earlier findings in showing that learning effects for different component movements in a motion pattern are quite distinct. Transfer of response from one directional pattern of motion to others presents certain striking features when examined in terms of the component movements of the motion sequence. Manipulative movements show generally a positive transfer effect. Travel movements display generally negative transfer effects. The degree of transfer effect from a given training pattern varies with the direction of response. All of these effects are specific to the component of movement under consideration. Bilateral transfer effects occur. Generally speaking, there are two patterns of motion among the four studied which are associated with the high levels of efficiency by the left hand when transfer occurs bilaterally. Transfer effects as described persist relatively unaltered over an interval of one week's time. (From the authors' summary)

2187

Trincker, D. 1953
[LIGHT-DARK ADAPTATION AND DEPTH PERCEPTION: II. THE DEPENDENCE OF PERCEIVED DISTANCE ON LIGHT-DARK ADAPTATION] Hell-dunkel Anpassung und räumliches Sehen. II. Die Abhängigkeit der Sehferne von der Hell-dunkel Anpassung. — Pflügers Archiv für die gesamte Physiologie (Berlin), 257 (2): 87-107. 1953. In German. DLC (QP1.A63, v. 257)

The Pulfrich effect (an object oscillating rectilinearly in a horizontal plane is perceived as moving in an elliptic curve by a subject whose one eye is covered by a medium-dense filter) has been explained as caused by uneven retinal stimulation: the visual effect of the covered eye (greater distance perceived) "lags" behind that of the uncovered eye (nearness perceived). The author has determined perception of "depth" (Pulfrich effect on stationary objects) using the following experimental methods: (1) binocular observation with filter over one eye; (2) monocular observation with partial shading of the visual field; and (3) binocular and monocular observation (without a filter) against a background of divided brightness, thus reproducing the "asymmetric" effect. The difference between the distances perceived by the dark- and light-adapted eyes was found to progress in a hyperbolic function relative to the decrease of brightness in the dark-adapted eye. The psychophysical mechanism is discussed.

2188

Trites, D. K., 1953
W. H. Holtzman, R. C. Templeton, and S. B. Sells
PSYCHIATRIC SCREENING OF FLYING PERSONNEL: RESEARCH ON THE SAM SENTENCE COMPLETION TEST. — Univ. of Texas, Austin (Contract AF 33(038)13887); issued by School of Aviation Medicine, Randolph Field, Tex. July 1953. 23 p. (Project no. 21-0202-0007, Report no. 3). AD 19 567 PB 110956

The School of Aviation Medicine (SAM) Sentence Completion Test was administered to 2185 aviation cadets and student officers entering the Basic Pilot Training School at Randolph Field. The 88 incomplete sentence items were designed to evoke attitude responses related toward self, the Air Force flying, combat, family, sex, social institutions, and interpersonal relations. These attitudes are represented as categories in the evaluation code

for scoring (appendix). A rank-ratio scoring key which was developed to measure the attitude patterns produced statistically significant biserial validity coefficients ranging from 0.32 to 0.13, depending on the characteristics of the criterion groups used. Application of cutting points to the pooled score distributions of two validation samples resulted in correct identification of 57% of the pass and 83% of the fail group for whom predictions were made. Further investigation of the validity of this test is recommended. (AD abstract)

2189

Trumbull, R. 1953
ANALYSIS OF BASIC FACTORS CONSTITUTING NECESSARY MATHEMATICAL PROFICIENCY REQUIRED FOR SUCCESS IN NAVAL AVIATION. REPORT III. MULTIPLICATION. — Naval School of Aviation Medicine, Pensacola, Fla. Feb. 1, 1953. iii+26+19 p. (Project Report no. NM 001 058.20.03). AD 8761 UNCLASSIFIED

Test items were developed to appraise the difficulty values of various digits in positions of multiplicand and multiplier in the performance of multiplication by Naval Cadets. Items were selected in terms of difficulty level with definite increments providing a wide range of difficulty. Items with 1-digit multipliers were supplemented by items with 2-digit multipliers to provide a measure of the errors in complex multiplication attributable to the addition of primary products. Items manufactured on the basis of previously determined process errors, and items selected on the basis of established error count were incorporated in the final test form. The final 34-item test with scoring confined to 18 selected items (ten 1-digit multiplications and eight 2-digit multiplications) had class-class reliabilities ranging from 0.69 to 0.82. The test was given to 138 Naval Cadets with no time limit. The item error potential ranged from 4.35% to 26.09%. (cf. Trumbull, R., 1952, 1952a) (AD abstract)

2190

Trumbull, R. 1953a
ANALYSIS OF BASIC FACTORS CONSTITUTING NECESSARY MATHEMATICAL PROFICIENCY REQUIRED FOR SUCCESS IN NAVAL AVIATION. REPORT IV. DIVISION. — Naval School of Aviation Medicine, Pensacola, Fla. April 1, 1953. 5+21+16 p. (Project Report no. NM 001 058.20.04). AD 12 323 UNCLASSIFIED

The errors of naval aviation cadets in the arithmetic operation of division were analyzed to develop a series of test items with a consistent range of difficulty. The items employed 1- and 2-digit divisors and 2-digit dividends with and without carry-over. The mental operation of retaining a remainder and altering the face value of the next part of the dividend contributed significantly to error. Differences were found when the digits 2, 3, 4, 5, 7, and 9 were used as divisors. Digits 6 and 8 involved more difficulty in items into which they went evenly than in items demanding carry-over. Items with 2-digit divisors were used for an analysis of performance on paper rather than mental. Some subjects were prone to err in certain operations in which incorrect answers in division consistently were attributable to inaccurate subtraction or multiplication. The influence of set established by items preceding selected test items was studied. (From AD abstract)

2191

Trumbull, R. 1953b
ANALYSIS OF BASIC FACTORS CONSTITUTING NECESSARY MATHEMATICAL PROFICIENCY REQUIRED FOR SUCCESS IN NAVAL AVIATION. REPORT V. ALGEBRA. — Naval School of Aviation Medicine, Pensacola, Fla. April 6, 1953. 5+2 p. (Project Report no. NM 001 058.20.05). AD 15 172 UNCLASSIFIED

The performance of 194 naval aviation cadets on 48 algebraic items was evaluated to aid in the development of tests for cadet selection. The study was based on 4 simple algebraic operations involving addition and subtraction of unknowns, with and without transpositions, in first-degree equations. An analysis of errors established that the highest error potential was achieved when the transposition of one unknown was required prior to the summation of unknowns and solution. (cf. Trumbull, R., 1952, 1952a, 1953, 1953a) (AD abstract)

2192

Tsireshkin, B. D. 1953
[CONTRIBUTION TO THE AUDIOMETRIC METHOD] K metodike audiometrii. Vestnik otorino-laringologii, (Moskva) 15 (4): 69-72. 1953. In Russian. DNLM

Hearing tests were carried out on 30 normally hearing subjects, 22 to 45 years of age, using 10 different audiometric systems. As a result, the author recommends as the best a system which (1) determines the intensity of sound at a clearly audible level; (2) gradually decreases the intensity to the point of inaudibility for the subject, interrupting the sound before each change of intensity; (3) after determination of the first nonaudibility of the sound, increases it to audibility; and (4) determines the threshold according to the intensity at which the perception reappears. The sound duration of either intensity should be between 5 to 7 seconds, and the switching off of the sound should be instantaneous. Such a device shows the smallest divergencies in various measurings, not exceeding 5 decibels for the majority of sounds (while other systems diverge up to 10 db.). Moreover, this device is less fatiguing and less inducive to negative adaptation. However, audiometry determines only the perception of pure tones. For complete auditory examination the addition of speech perception and tuning fork tests is necessary.

2193

Tucker, J. A. 1953
RELATIVE PREDICTIVE EFFICIENCY OF MULTIPLE REGRESSION AND UNIQUE PATTERN

TECHNIQUES. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin 53-2, Feb. 1953. vi+25 p. (Project no. 503-001-0015). AD 14 723 PB 110646

The unique-pattern technique was compared to the multiple-regression technique for predictive efficiency in personnel selection and classification. The unique-pattern scores are based on the subject's pattern of response to a series of items; this technique is fundamentally a method of classification by breaking down data into component parts. The unique-pattern method did not predict as well as the multiple-regression method on the 6 problems presented. (AD abstract)

2194

Tupes, E. C. 1952f
THE VALIDITY OF THE AIRMAN CLASSIFICATION BATTERY AC-1 FOR PREDICTION OF VARIOUS OFFICER CANDIDATE SCHOOL CRITERIA. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-13, May 1952. 5 p. (Project no. 503-002-0007). ATI 179 713 UNCLASSIFIED

Results of the Airman Classification Battery AC-1 tests administered to an Officer Candidate School (OCS) class were correlated with the following criteria: OCS academic grades, OCS military grades (Proficiency ratings), OCS "buddy ratings", OCS over-all grades, and ratings obtained by each OCS graduate near the end of a six months on-the-job training assignment at Lackland Air Force Base. While there exist considerable intercorrelations between these five criteria, the correlations of the Airman Classification Battery AC-1 with these criteria showed the following results: (1) very few tests are valid for the prediction of OCS over-all grades, military grades, or buddy ratings; (2) only about one third of the tests are valid for the prediction of academic grades; and (3) all the tests correlate negatively with the on-the-job performance ratings.

2195

Tupes, E. C., 1952g
and D. J. Thornhill
THE RELATIONSHIP BETWEEN SUCCESS IN OFFICER CANDIDATE SCHOOL AND OFFICER EFFECTIVENESS REPORTS. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-18, June 1952. 6p. (Project no. 503-002-0007). ATI 159243 UNCLASSIFIED

Correlations are established between Officer Effectiveness Report (OER, Form 77A) scores and previous performance and achievement data in Officers Candidate School (OCS). The sample consisted of 147 officers. The following OCS data were used: amount of education, OCS "buddy ratings", OCS proficiency grades assigned by OCS tactical officers, OCS academic grades and OCS overall average grades. The following results are shown: (1) buddy ratings correlate more highly with OER-Form-A ratings than education and academic grades; (2) however, all OCS measures correlate positively with the Form-77A ratings. This suggests that the study of behavior in OCS should be a useful predictor for officer performance. Correlations between separate OCS and OER items are tabulated and critically evaluated.

2196

Tupes, E. C., 1953
W. R. Borg, and G. Friedman
A FACTOR ANALYSIS OF THE OCS PAIRED-COMPARISON EVALUATION SYSTEM. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Technical Report no. 53-10, June 1953. v+9 p. (Project no. 503-002-0005). AD 18 955 UNCLASSIFIED

Thirty paired-comparison evaluation scores (PCES) were assigned to 236 U. S. Air Force officer candidates by 20 to 25 of their classmates. Intercorrelation and factor analysis of the scores revealed a general factor based on impressions of over-all potentiality as an officer, a group factor measuring administrative ability, a group factor concerned with working effectively with others, a group factor measuring the striving to do a good job, a group factor concerned with the acceptance of organizational responsibi ty, and a residual factor. The high median intercorrelation (0.74) between the variables suggested a lack of discrimination among the 30 specific behaviors. The PCES were based mainly on the general factor, and the candidates were rank-ordered satisfactorily upon that basis. The system was not as satisfactory in determining the specific areas in which candidates were strong or weak. (AD abstract)

2197

Tupes, E. C. 1953a
THE VALIDITY OF THE AVIATION CADET-OFFICER CANDIDATE QUALIFYING TEST AXA AND AXB FOR PREDICTION OF SUCCESS IN USAF OFFICER CANDIDATE SCHOOL. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Technical Report no. 53-35, Dec. 1953. iii+11 p. (Project no. 503-002-0003). AD 23 036 UNCLASSIFIED

The correlations between subtests on the Aviation Cadet-Officer Candidate Qualifying Test (AC-OCQT) and criteria of success within Officer Candidate School (OCS) were computed for a total of seven Officer Candidate School (OCS) classes (total number, about 1130 cases) split into a validational and a cross-validational sample. Multiple correlations and beta weights were computed for the first sample against OCS final military grades, final academic grades, and final over-all grades. Several experimental composites were tried out and cross-validated on the second sample, yielding correlations of about .20 against military grades, .50 against academic grades, and .40 against over-all grades. Although validities of this magnitude do not account for the major portion of criterion variance, screening of OCS applicants by use of the AC-OCQT test would result in a decided improvement in the average OCS grades of officer candidates, if the standards of grading existing

when these data were gathered should continue in effect. (From the author's summary)

2198

Tupin, [M.] and Camou 1952

[AURICULAR MANIFESTATIONS AND ULTRASOUND] Manifestations auriculaires et ultrasons. — Annales d'oto-laryngologie (Paris), 69 (5-6): 373-376. 1952. In French. DNLM

Physiological effects of ultrasound upon two groups of industrial workers are described. Group I: Three men working in the vicinity of a Hartmann siren (60,000 c.p.s. and 183 db.) felt generally fatigued after work. Two subjects of this group, who had been employed for only a few months, experienced during ultrasound emission a painful sensation, which was absent in the older employee. Group II: Of three workers occupied near a turboreactor compressor, the most recent employee (6 months) suffered from violent headache and general fatigue after work; the older employee ($1\frac{1}{2}$ years) had had these symptoms during the first 3 months, accompanied by temporary paraplegia. Upon examination, hemorrhage of the meninges had been discovered. This man was now free of complaints. A third subject (female) working on the right side of the compressor, complained of left-sided hemicrania and hyperesthesia of the scalp. All the senses of this subject were supernormally developed (visual acuity 18/10, overacute taste, smell, and hearing in the frequency range of 2896 to 8000 c.p.s., more pronounced on the left). --- In all the six subjects, the average audiograms showed normal hearing of air-borne sounds up to 2048 c.p.s. and, beyond that, pronounced superaudition of 10-20 db., maximal at 2896 c.p.s. There was a slight hearing loss below 4096 c.p.s. in the hearing of bone-conducted sounds, and superaudition of 5 db. above this frequency.

2199

Tupin, M. 1953

[THE AURICULAR BLAST] Le blast auriculaire. — Journal français d'oto-rhino-laryngologie et chirurgie maxillo-faciale (Paris), 6 (6): 548-561. 1953. In French. DNLM

In all types of blast injuries of the ear, the proximity of the subject at the time of the accident is of importance. Pathological changes are due to a sudden, brutal positive shock wave, followed by a longer negative wave. It seems that tympanic perforations without significant labyrinthal lesions are caused chiefly by positive pressure, while damage to the labyrinth without tympanic perforation is caused by negative pressure. The symptoms of auricular blast injury with and without tympanic perforation and psychogenic deafness after blast injury are described. An important factor in blast injury treatment is to avoid any penetration of liquid into the ear, even for cleansing purposes, nor should liquid antiseptics be applied, as long as there is no infection; antibiotic powders and aseptic dressings should be used instead. Inner ear treatment is not possible.

2200

*Turanov, V. V. 1952

[ON THE PROPHYLAXIS OF MOUNTAIN SICKNESS] O profilaktike gornoĭ bolezni. — In: Kislorodnaîa terapiîa i kislorodnaîa nedostatochnost'. Kiev, 1952, p. 93-97. In Russian.

The efficiency of two drug mixtures, (luminal and caffein and the so-called "acid mixture" (ascorbic acid, citric acid, and glucose)) in the prophylaxis of mountain sickness were compared, and their combined action was studied on individuals ascending Mount Elburs (18,468 ft.). After the use of these prophylactic drugs, the symptoms of mountain sickness (headache, sleepiness, weakness, nausea, heartbeat, dyspnea, vertigo, and vomiting) were observed much less frequently than in the control group; the "acid mixture" prevented more symptoms than the luminal-caffein mixture, except for headache, where luminal-caffein was preferable. Vomiting was never observed after administration of the "acid mixture". Following administration of luminal and caffein, mountain sickness was observed in 2 out of 25 subjects. The two mixtures combined were more effective than each one separately. However, these drugs proved less effective on heart beat and dyspnea. The following is a breakdown of subjects unaffected by mountain sickness: 21% of the controls, 52% of those treated with luminal and caffein, 63% of those treated with the "acid mixture" and 75% of those treated with both mixtures. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Fiziologiîa, 1953 (14): 45. DNLM (ZW1.qS729)].

2201

Uhlaner, J. E., D. A. Gordon, I. A. Woods, and J. Zeidner 1953

THE RELATIONSHIP BETWEEN SCOTOPIC VISUAL ACUITY AND ACUITY AT PHOTOPIC AND MESOPIC BRIGHTNESS LEVELS. — Jour. Applied Psychol., 37 (3): 223-229. 1953. DLC (BF1.J55, v. 37)

Nineteen subjects were employed, selected to show a wide range of scotopic acuity scores. Scotopic acuity was measured with the Army Night Vision Tester (ANVT-R2X). Brightnesses ranged from 3.51 to 5.26 log μμL. Mesopic and photopic acuities were measured with various wall chart tests and targets used in a modified Ortho-Rater instrument. Brightness levels ranged from 6.03 to 10.60 log μμL. The main findings of this study are as follows: Scotopic acuity scores showed moderate positive correlations with the photopic acuity scores. and higher correlations with mesopic acuity scores, both for the wall chart tests and the Ortho-Rater plates. The Landolt Ring acuity target shows higher correlations with the Army Night Vision Tester than do the other targets. High correlations with mesopic acuity were obtained in the present study, even though the scotopic test was administered to the subjects a full year before administration of the photopic and mesopic tests. As a consequence the practicability of developing a mesopic test of night vision ability is indicated. Such a test would have the follow-

ing advantages over a scotopic test: shorter adaptation time (hence more rapid testing), less expensive and cumbersome equipment, less dependence on light-tight testing conditions, and fewer testing personnel. (From the authors' summary)

2202

Ulett, G. A., and G. Gleser 1953

PSYCHIATRIC SCREENING OF FLYING PERSONNEL: THE DEVELOPMENT OF EMPIRICAL SCALES FOR THE PREDICTION OF ANXIETY-PRONENESS FROM THE EEG AND REACTION TO INTERMITTENT PHOTIC STIMULATION. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 33(038)-13884); issued by School of Aviation Medicine, Randolph Field, Tex. June 1953. iii+10 p. (Project no. 21-0202-0007, Report no. 7). AD 19 668 PB 110957

Three empirical scales were developed for quantitative scoring of the anxiety-proneness of 105 volunteers and 33 patients: (1) basic EEG record with eyes closed and subject relaxed, (2) EEG response to photic stimulation over flicker frequencies from 2 to 30 flashes/second, and (3) subjective sensations induced by the flickering lights. The experimental data were evaluated against the anxiety-prone subject ratings made by a psychiatrist and a psychologist after interviews and tests. When used with a cutting score of 4 or greater, the combined scales selected only 11% of the non-anxiety-prone normal subjects, 59.4% of the anxiety-prone normal subjects, and 65.5% of the anxious patients. (AD abstract)

2203

Ulett, G. A., G. Gleser, P. Starr, J. Haddock, L. Lingley, and A. Lawler 1953a

PSYCHIATRIC SCREENING OF FLYING PERSONNEL: FURTHER STUDIES TOWARD THE DEVELOPMENT OF AN ELECTROENCEPHALOGRAPHIC SCREENING TECHNIQUE. — Washington Univ. School of Medicine, St. Louis, Mo. (Contract AF 33(038)-13884); issued by School of Aviation Medicine, Randolph Field, Tex. August 1953. iii+25 p. (Project no. 21-0202-0007, Report no. 5). AD 19 569 PB 112130

The scale for photically induced subjective sensations and two possible scales for evaluating the basic EEG were found to be valid for the discrimination of anxiety-prone individuals in the sample studied. Scales based on a combination of the above yielded correlations of .36 and .32 with the criterion of anxiety-proneness. — The two scales developed for evaluation of electronically analyzed basic EEG variables were shown to have a high reliability for the determination of individual differences both within a single record and over an interval of time. Reliability was also demonstrated for the scales derived from these variables and from clinical inspection of the EEG record. — The previously developed scale for EEG response to intermittent photic stimulation did not prove valid on the present sample, although trends in the present data suggest that photic driving should be further investigated. It is concluded that the physiological measures developed herein show promise as a technique for the screening of military personnel. (From the authors' summary and conclusions)

2204

Ulett, G. A., G. Gleser, G. Winokur, and A. Lawler 1953 b

THE EEG AND REACTION TO PHOTIC STIMULATION AS AN INDEX OF ANXIETY-PRONENESS. — Electroencephalography and Clinical Neurophysiol. (Montreal), 5 (1): 23-32. 1953. DNLM

Electroencephalograms, psychological tests, and psychiatric interviews were analyzed in an attempt to establish a criterion for anxiety-proneness. The EEG recordings were made during rest, during psychological stress, and during exposure to intermittent photic stimulation at various frequencies. One hundred and ninety-one patients and controls were tested. Significant correlation was found between alpha-wave activity in resting EEG, patterns of fundamental driving response, amount of harmonic driving response to flicker frequencies, and the amount of dysphoria produced by intermittent photic stimulation. Statistical correlation of the experimental anxiety indicators with interview data shows that EEG methods may be of value in selecting anxiety-prone individuals.

2205

Ullmann, E. A. 1952

THE POLYURIA ASSOCIATED WITH ANOXIC ANOXIA. — Jour. Physiol. (London), 116 (4): 3P-4P. 1952. DLC (QP1.J75, v. 116)

The effects of anoxic anoxia on renal excretory functions were investigated. Polyuria caused by breathing oxygen at low pressures is attributed not to anoxia directly, but to the alkalosis which develops as a result of anoxic hyperventilation. A very slight increase in urine flow was caused when hyperventilation took place in subjects who had not taken any fluids for 6-12 hours (without evidence of dehydration). However, even a slight amount of water (250-400 milliliters) taken shortly before the onset of hyperventilation sufficed to increase the rate of urine secretion to 12-15 ml. per minute, more than the sum of the separate diuretic responses to water and hyperventilation.

2206

Ullmann, E. A. 1953

RENAL WATER AND CATION EXCRETION AT MODERATE ALTITUDE. [Abstract]. — Jour. Physiol. (London), 120 (4): 58P-59P. 1953. DLC (QP1.J75, v. 120)

Water and sodium metabolism were studied in one healthy subject during 12 days in London, 29 days on the Jungfraujoch (11,340 ft.; barometric

pressure around 500 mm. Hg) and a further 14 days in London. No symptoms of altitude sickness were experienced at any time. Voluntary or anoxic hyperventilation of short duration at sea-level leads to an immediate increase in renal sodium, potassium, and water output; water diuresis is markedly accelerated; urinary pH rises, and ammonia and titratable acid excretion fall. By contrast, during the first 2 days on the Jungfraujoch water sodium and potassium excretion were strongly depressed. On the third day a sodium diuresis began, which lasted for 3 days. The daily sodium balance became negative (mean -42 m. equiv./day), and water and weight was lost in spite of a high calorie intake. From the 6th to the 29th day, no further significant disturbance of water balance occurred. From the 7th day on the Jungfraujoch onward, renal potassium excretion increased progressively. The findings suggest a possible increase in adrenocortical activity at altitude. The stimulus for the initial inhibition of water and fixed base excretion cannot be attributed to anoxia or alkalosis but was probably due to some non-specific factor connected with change of environment, perhaps acting through release of antidiuretic hormone from the posterior pituitary. This is suggested by the fact that exactly the same sequence of events occurred on return to sea level. (From the abstract)

2207

Vacca, C., 1953
and E. Boeri
(EXPERIMENTAL RESEARCHES ON THE RELATIONSHIP BETWEEN HYPOPHYSIS AND HYPOXIC POLYGLOBULIA) Ricerche sperimentali su le relazioni esistenti tra l'ipofisi e la poliglobulia da ipossia. — Rivista di medicina aeronautica (Roma), 16 (2): 139-152. 1953. In Italian, with English, French, Spanish, and German summaries (p. 149-152). DLC (TL555.A1R5, v. 16)

Hypophysectomized rats and normal controls were exposed to simulated altitudes in the following order: (1) to 26,000 ft. for 4 hours; (2) to 40,000 ft. for 2 hours; (3) to 26,000 ft. for 15 consecutive days, 4 hours per day; and (4) once more to 40,000 ft. for 2 hours. After sudden exposure to a high degree of anoxia (Experiment 2), the hypophysectomized animals did not reveal symptoms generally associated with anoxia, such as polyglobulia hyperglycemia, or neutrophil trend of the leukocytes. The mortality of the hypophysectomized rats was 24%, as compared to 7.1% in the controls. Chronic anoxia (Experiment 3), however, did not affect the hypophysectomized rats; long exposure to altitude even increased their resistance to acute, extreme anoxia (Experiment 4). Thus it was shown that the pituitary mechanism and related metabolic functions depend on whether anoxia is chronic or acute.

2208

Vail, E. G. 1953
DYNAMIC RESPONSES WITHIN THE THORAX TO EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression, p. 55-85. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77).
AD 27 765(i) UNCLASSIFIED

Literature data on the effects of explosive decompression on the thorax are reviewed. Decompression of dogs to an ambient pressure of 30 mm. Hg resulted in the formation of vapothorax which caused distention of the thorax and partial lung collapse. Partial obstruction of the larynx may cause a pulmonary pressure which is sufficient for the prevention of lung collapse. X-rays showed gas in the heart within 30 seconds after decompression. Extreme cardiac dilatation, which may last for several weeks after decompression, produced considerable myocardial damage. The residual lung pressure which developed during decompression produced massive bronchial dilatation. The atelectasis observed was the result of the effects of the altitude upon intrapleural pressures plus the loss of gas from the lungs at high altitude. Water vapor condensation in the alveolar space during recompression collapsed the alveolar sacs. The flow pattern which occurred immediately upon recompression supports the above hypothesis. (AD abstract, modified)

40 references.

2209

Vail, E. G., 1953a
D. A. Rosenbaum, and F. A. Hitchcock
ROENTGENOGRAM STUDIES OF THE EFFECTS OF EXPLOSIVE DECOMPRESSION AND EXPOSURE TO AN AMBIENT PRESSURE OF 30 mm Hg UPON THE GASTRO-INTESTINAL TRACT AND THE GALL BLADDER. — In: Ohio State Univ., Studies in explosive decompression, p. 111-118. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(m) UNCLASSIFIED

The effects of explosive decompression on the gall bladder and the gastrointestinal tract were studied in anesthetized dogs decompressed from 520 to 30 mm. Hg. The dogs had been given Priodax orally one day before the experiment and a barium meal several hours or immediately before decompression. No swelling or gas formation was observed in the gall bladder. Water vapor was more likely to be formed in the thorax than in the abdomen at ambient pressures less than the vapor pressure of the body fluids. Massive dilatation of the stomach and intestine was observed. Pressures produced in the stomach were sometimes great enough to cause regurgitation of chyme into the esophagus and mouth; subsequent recompression occasionally resulted in aspiration of chyme into the lungs. (AD abstract, modified)

2210

Vail, E. G., 1953b
and F. A. Hitchcock
THE TEMPERATURES IN THE LUNGS AND

HEART BEFORE AND AFTER EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression, p. 168-182. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(r) UNCLASSIFIED

The temperature of the air in the lungs and of the blood in the heart and aorta, before and after explosive decompression, were measured with thermistors. The dogs used in lung-temperature tests were explosively decompressed to terminal pressures of from 510 to 30 mm. Hg. There was a temperature gradient in the respiratory tract as the alveolar air escaped from the lungs; this gradient was greater in tracheotomized than in intact animals. When, after explosive decompression, animals were exposed to ambient pressures less than the vapor pressure of body fluids, the air temperature in the lungs dropped an average of 8.8°C. Temperature-respiratory patterns showed variations which increased as the lower terminal pressures were reached. The existence of a temperature gradient between the blood of the right and left heart was confirmed. (AD abstract, modified)

2211

Valade, P., 1953

P. Bugard, F. Coste, and J. Salle

[ELEMENTS OF "SONIC" PATHOLOGY: THE EXPERIMENTAL TRAUMATO-VIBRATORY SYNDROME] Eléments de pathologie "sonique". Le syndrome traumato-vibratoire expérimental. — Bulletin de l'Académie vétérinaire de France (Paris), 26 (2): 113-122. 1953. In French. DNLM

The effects of noises or ultrasounds were studied in 38 rabbits, 12 guinea pigs, and 8 dogs. Noises were produced by (a) a Pimonow siren (160 db., 25 c.p.s.), (b) a piston-type motor, (c) a pulse-jet engine, (d) a turbo-jet engine (130-140 db., 1- to 6-hour exposures), and (e) a Hartmann whistle (130 db., 25 or 55 c.p.s.). The Pimonow siren produced agitation, convulsions, and subsequent, apparently irreversible, paralysis of the limbs in rabbits. At a close distance from the siren (20-30 cm.) death occurred in 4-10 minutes. The body temperature, measured immediately after death, was 44.7 to 45.6°C. Examination revealed pulmonary congestion and edema, epithelial destruction of the medullo-adrenal region, and coagulation of proteins in the sarcoplasm of the heart, probably due to hyperthermia. After 1- to 8-hour exposures to the jet engine- or piston-type motors, the animals became deaf and depressed, but recovered after several hours. After 100 hours of exposure at a rate of 4 hours per day, the animals' behavior remained normal, without any loss of weight. In general, the traumatic action of vibration was followed by an increase in the total number of leucocytes. Four hours after the cessation of noise, neutrophile polynucleosis, transitory eosinophilia followed by eosinopenia, and lymphopenia were observed. Glycemia increased slightly. Urinary excretion of 17-ketosteroids seemed to decrease. The EEG of the rabbits exposed to jet engine noise showed a significant and lasting cortical hyperactivity, with periods of slow large-amplitude waves.

2212

Van Liere, E. J. 1953

MOTION SICKNESS. — West Virginia Med. Jour., 49 (8): 222-225. 1953. DNLM

Effective motion sickness remedies are particularly important to the military during wartime to ensure optimum fitness of transported troops after landing. Investigations into motion sickness have indicated involvement of the following factors: (1) psychic influences, (2) mechanical factors, and (3) dietary influences. A list of drugs which have been found to give protection against motion sickness includes antihistaminic and anticholinergic drugs. Reference is made to the papers, Chinn, 1952 to 1952f.

2213

Vanderplas, J. M. 1953

INTERIOR COLOR SCHEMES FOR AIRCRAFT GRAY INSTRUMENT PANEL. — Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. Technical Note no. WCRD 53-71, June 1953. 3+7 p. (RDO no. 694-41). ATI 203 286 UNCLASSIFIED

This report constitutes a discussion of visual adaptation factors affected by the use of gray as a color for aircraft instrument panels. A summary and discussion are presented of considerations, evolved at recent mock-ups and conferences at the Wright Air Development Center, of factors of aircraft instrument panel brightnesses as they affect instrument reading and exterior visibility. It is concluded on the basis of these considerations that a gray color, number 3520 in Federal Specification TT-C-595 is suitable as a color for instrument panels from the standpoint of visual adaptation requirements. (Author's abstract)

2214

Vasilas, J. N., 1953

R. Fitzpatrick, P. H. Dubois, and R. P. Youtz

HUMAN FACTORS IN NEAR ACCIDENTS. — American Inst. for Research, Pittsburgh, Pa. (Contract AF 33(038)-21662); issued by School of Aviation Medicine, Randolph Field, Tex. June 1953. iv+65 p. (Project no. 21-1207-0001). AD 14 889 PB 110822

A total of 1778 reports were collected from pilots with respect to near-accidents involving psychological error. The most effective collection method involved periodic group meetings where individual anonymous reports were written. The reports were classified according to the type of aircraft, aircrew job, and phase of flight; the behavior was analyzed with respect to remedying the malfunctions. The pilot error component of accidents appeared much larger than heretofore believed. (AD abstract)

2215

Vasilenko, M. E. 1953

[CONDITIONED-REFLEX ERYTHROCYTOSIS

DURING HYPOXEMIA] Ob uslovno reflektornom eritrotsitoze pri gipoksemii. — Zhurnal vysshe˘ nervnoĭ deĭatel'nosti (Moskva), 3 (5): 744-753. 1953. In Russian. DNLM (W1. ZH425, v. 3)

Study of peripheral blood composition in dogs after 22 two-hour elevations to a simulated altitude of 7000 m. showed an increase in hemoglobin (3-7%) and erythrocytes (750, 000-950, 000) and a double to threefold increase in reticulocytes after each elevation. A sharp increase in erythropoietic action was observed in the bone marrow. After 5 ascents, the manipulations and preparations for simulated elevation alone induced in the animals the same changes to the same degree as the ascent itself, including increased rate of respiration and lowered temperatures (0.1-0.2°C.). Rapid elevation to the ultimate atmospheric pressure ceiling induced a much lesser increase in erythrocytes and hemoglobin content of peripheral blood than prolonged ascents to lower (7000 m.) altitudes. Thyroidectomized animals did not manifest any changes in peripheral blood composition after real or simulated elevations during the first months after the operation. Lateron, some changes were observed. The author concludes that the changes in blood composition induced by low air pressures are the result of a complex reflex mechanism which includes a conditioned reflex component and "humoral links", one of which is provided by the thyroid gland.

2216

Veneklasen, P. S. 1953
NOISE CHARACTERISTICS OF PULSE-JET ENGINES. — Jour. Acoust. Soc. America, 25 (3): 378-380. 1953. DLC (QC221.A4, v. 25)

Data are presented showing the magnitude, spectral characteristics, directional properties, and variation with operating conditions of the noise produced by pulse-jet engines. Two engines were studied, one 5.75 in. the other 9.4 in. in diameter. Recordings were taken on magnetic tape from which the analyses were made. A typical analysis of the noise spectrum reveals that the lowest sound level position is at zero degrees, that is, directly ahead of the engine. The maximum level occurs at about the 135° position. In addition to the spatial survey, tests were made on the larger engine to determine the change in noise spectrum with the rate of fuel flow. The operating frequency decreases as the fuel flow and thrust are increased. With regard to the control of noise in flight, weight and size are of extreme importance.

2217

Veneklasen, P. S. 1953a
NOISE CONTROL FOR GROUND OPERATION OF THE F-89 AIRPLANE. — Jour. Acoust. Soc. America, 25 (3): 417-422. 1953. DLC (QC221.A4, v. 25)

A noise control project is described which includes a noise muffler for the ground testing of the F-89 airplane which is powered by two turbojet engines. Included are the prediction of performance, acoustical design considerations, correlation of acoustical and thermodynamic requirements, general construction, acoustical tests during construction, noise survey around the exposed airplane, and neighborhood survey around the completed installation. This noise suppressor is comparatively simple and inexpensive, requires no water cooling even for afterburner operation, and has proved adequate in terms of neighborhood relief and protection of operating personnel. (Author's summary)

2218

Violette, F. 1953
[GAS EXPANSION IN THE ORGANISM DURING EXPLOSIVE DECOMPRESSIONS] L'expansion des gas de l'organisme au cours des décompressions explosives. — Comptes rendus de l'Académie des sciences (Paris), 237 (12): 625-627. 1953. In French. DNLM

The harmfulness of an explosive decompression depends on two factors: time of decompression and degree of gas expansion in the body. However, when water vapor is present, the adiabatic expansion of the mixture follows Guldberg and Möhn's law instead of Laplace's law. Pressure-temperature, and volume-temperature functions, corresponding to reversible adiabatic expansions of the body gas-water vapor mixtures, have been computed. Results show that a much greater relative decompression is needed above 11, 000 m. to arrive at identical temperature decreases of the gaseous mixture.

2219

Voss, W. 1953
[CONTRIBUTION TO THE PROPHYLAXIS OF AIRSICKNESS] Beitrag zur Prophylaxe gegen Luftkrankheit. — Medizinische Monatsschrift (Stuttgart), (26): 879-881. 1953. In German. DNLM

The effects of vitamin B_6 on airsickness were tested on 315 susceptible air passengers (263 adults, including 5 pregnant women, and 52 children). Ten tablets, at 20 mg. each, of Hexobion-Merck (pyridoxin hydrochloride), were administered during the flights. Results were positive in approximately 60% of the cases (i.e., definite threatening airsickness could be avoided), uncertain in 30% (no symptoms of sickness had yet appeared), and negative in 8%. The effect was greatest in the children and in the 5 pregnant women, although these women had been apprehensive because of previous failure of other remedies. Speaking especially in favor of Hexobion was the fact that the results were the same (positive 59%) in the groups traveling a short distance with many stops. No side effects, such as sedation or tiredness, were observed. An average dosage of 4 tablets (80 mg.) is sufficient for a 2-hour trip, and 12 tablets for the North Atlantic passage.

2220

Wake, R. F., 1953
B. F. Graham, and S. D. McGrath
A STUDY OF THE EOSINOPHIL RESPONSE TO

EXERCISE IN MAN. — Jour. Aviation Med., 24 (2): 127-130. 1953. DLC (TL555.A1A4, v. 24)

Twenty-one healthy males were exercised in a gymnasium for twelve hours from 8 a.m. to 8 p.m. On another day they were rested for a similar period. On each occasion eosinophil counts were obtained every two hours. Statistical evaluation of the data indicated that the counts, other than the first and second, were significantly lower on the day of exercise. It may be concluded that exercise of this order causes activation of the adrenal cortex. (Authors' summary)

2221

Wald, G. 1952

ALLEGED EFFECTS OF THE NEAR ULTRAVIOLET ON HUMAN VISION. — Jour. Optical Soc. Amer., 42 (3): 171-177. 1952. DLC (QC350.O6, v. 42)

It has been reported that short exposures of the human eye to near ultraviolet radiation in the wavelength range of 290-365 mμ produce appreciable changes in subsequent dark adaptation, and a lasting depression of visual sensitivity, rod and cone. These reports are hard to reconcile with the fact that only traces of such radiation reach the retina. Wavelengths shorter than 300 mμ are absorbed by the cornea of the eye, and they can do damage; longer wavelengths up to 400 mμ are absorbed in the lens. The assertion that such radiations affect the visual sensitivity is reexamined in the present paper. Exposures to ultraviolet light identical with those referred to, produce no appreciable effects on subsequent dark adaptation of the normal eye, rod, or cone. In lensless (aphakic) subjects, near-ultraviolet radiation in the neighborhood of 365 mμ does reach the retina and is clearly visible. Even in such persons, exposure to the near ultraviolet does not affect the threshold of rod vision after 20 minutes of dark adaptation. The early portions of dark adaptation -- the adaptation of the cones, and sometimes also the early rod thresholds -- may be raised; but these changes are caused, not by intrinsic effects of the ultraviolet, but by the increased brightness to which it gives rise in the aphakic eye. --- It is concluded that ultraviolet radiations which might harm the retina do not reach it; those which reach the retina do it no harm, and can at most be seen. (Author's abstract)

2222

Wallach, H., 1953
and D. N. O'Connell

THE KINETIC DEPTH EFFECT. — Jour. Exper. Psychol., 45 (4): 205-217. 1953. DLC (BF1.J6, v. 45)

When a three-dimensional form, solid or wire-edged, is turned behind a translucent screen and its shadow on the screen is observed, the shadow will appear as a rule as a three-dimensional rigid object which turns, quite similar to the physical object behind the screen. This happens not withstanding the fact that the subject actually looks at a plane figure which is being deformed. One condition seems to be essential for the occurrence of this effect: the shadow must display contours or lines which change their length and their direction simultaneously. If this condition is not fulfilled, a plane distorting figure like the one on the screen is perceived unless an influence of previous perception operates. This effect is believed to operate widely under ordinary circumstances. When one moves about, objects near one's path are successively seen from different angles, and this change in orientation of the object to the subject is the same as occurs when the object is turned by an equivalent angle. Thus, the object's reginal projection undergoes the same deformations as do shadows in our experiments, and the same perceptual processes should result. (Authors' abstract, modified)

2223

Wanner, J., 1953
and B. Jasinsky

[IRON METABOLISM DURING ACCLIMATIZATION TO HIGH MOUNTAIN CLIMATE] Die Eisenstoffwechsellage während der Adaptation ans Höhenklima. — Schweizerische Zeitschrift für Tuberkulose (Basel), 10 (3): 129-141. 1953. In German. DNLM

The following physiological changes were observed after ascent from the plain to high elevations in the mountains (3450 m. above sea level): increase in metabolism, oxygen consumption, and tissue acidity hyperventilation; accelerated circulation; initial erythrocytosis (from the spleen reserve) replaced, after a few days, by a stable increase of erythrocytes and reticulocytes (from the bone marrow); increase in bilirubin content (from the spleen) 2-3 times its normal rate within the first days; and concentration of body iron in the bone marrow; during the first hours the iron reappears in the hemoglobin of the new erythrocytes, and in various tissue elements like peroxydase, zytochrom, and catalase, all of which, especially the zytochrom, show an even greater increase at low oxygen pressures than the hemoglobin. In cases of latent iron deficiency (very frequent in women, rare in men) an additional iron supply is therefore indicated during acclimatization.

2224

Wapner, S., 1953
H. Werner, J. H. Bruell, and A. G. Goldstein

EXPERIMENTS ON SENSORY-TONIC FIELD THEORY OF PERCEPTION. VII. EFFECT OF ASYMMETRICAL EXTENT AND STARTING POSITIONS OF FIGURES ON THE VISUAL APPARENT MEDIAN PLANE. — Jour. Exper. Psychol., 46 (4): 300-307. 1953. DLC (BF1.J6, v. 46)

Three experiments were carried out concerned with the shifts of the position of the apparent median plane, defined as the straight-ahead. It was found that a test figure extending asymmetrically to the left of fixation produces a shift of the apparent median plane relatively to the left compared with a test figure extending asymmetrically

to the right of fixation. The effect of asymmetrical figural extent has been found to be significant irrespective of the degree of flux emanating from the figural surface. Furthermore, there was evidence for starting position effects, analogous to those previously found in studies on verticality; i.e., other things being equal, the position of the straight-ahead (apparent median plane) is relatively closest to the position in which a line is placed in the visual field; if a line is initially placed to the left of the objective median plane, in the objective median plane, or to the right of the objective median plane, the straight-ahead is shifted respectively more toward the left, more toward the center, more toward the right. (Authors' abstract)

2225

Ward, A. A. 1953

CENTRAL NERVOUS SYSTEM EFFECTS [OF NOISE]. — In: Benox report: an exploratory study of the biological effects of noise, p. 73-80. Univ. of Chicago, Ill., Dec. 1, 1953 (Contract N6ori-020, Task Order 44). AD 24 685 PB 114936

The effects of high-intensity noise on the reticular system in the brain were determined experimentally. A cat was anesthetized with Nembutal and electrical activity was recorded from the bulbar reticular formation at mesencephalic and pontine levels and from acoustic pathways in the brain stem. During exposure to a siren tone of 880 c.p.s. at an over-all sound level of 137 decibels there was an increase in frequency of the electrical activity of the reticular formation as recorded by the unipolar technique. Similarly, electrocardiograms taken from human subjects in the siren room at frequencies of 245-700 c.p.s. and at over-all levels of 120-137 db. showed characteristic changes, such as activation in the fronto-temporal region consisting of desynchronization with an increase in the low-potential fast activity. Effects of noise on the motor sphere manifest themselves in alterations of the deep tendon reflexes, changes in tone, and alterations in motor response. A discussion of clinical symptoms, of possible effects of noise above 140 db., and of possible protective measures (anti-cholinergic drugs such as Dramamine) concludes the study.

2226

Warren, N. D. 1953

NON-TRANSFERABLE FUNCTIONS. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 74-78. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

In an era in which some of man's functions may be transferred to a machine, it is apparent that non-transferable functions are dependent upon the complexity of the variables entering into a decision and the stability of the variables. Navigational decisions and flight control in which non-quantifiable variables (particularly psychic) come into play will, by necessity, remain a human function. The operator, either within the craft or on the ground, has the ability to perceive a pattern of continuously changing elements and is thus essential for control of flight.

2227

Warren, N. D., R. R. Mackie, R. F. Simmons, and I. L. Rodman 1953a

AN INDEX OF ACCIDENT EXPOSURE FOR FLYING IN USAF. — Psychological Services, Inc., Los Angeles, Calif.; issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. Report no. 39, July 1953. vi+73 p. AD 20 489 PB 113186

An Air Force-wide survey of pilots was undertaken to determine how pilots would react to the use of a measure of experience which differentially weighted exposure to accident hazard. In the survey, pilot awareness of the relative hazards of different aircraft types and different flying conditions was also measured. The following conclusions were reached: (1) The sum of hours and flights predicts accidents more accurately than either hours or flights alone. (2) Prediction of accidents within groups of aircraft models was slightly improved in this study by consideration of the accident hazard of night and instrument flying. (3) Accurate estimates indicated that instrument flying was in general about three times as hazardous as "Ceiling and Visibility Unlimited" (CAVU), and night contact flying was about one and a half times as hazardous as CAVU. (4) More than a quarter of a cross-section of pilots felt that hours alone were an inadequate measure of accident exposure. (5) A vast majority of pilots favor the use of some method of weighting by the accident hazard of various types of aircraft and kinds of flying. (6) Pilots can estimate the relative hazard of types of aircraft and conditions of flying with considerable accuracy. (7) However, pilot estimates of the accident hazards of fighter aircraft, of the landing phase of flight, and of normal flight phase, are markedly less than accident statistics would indicate. (Authors' summary and conclusions, modified)

2228

Webb, W. B., and C. Y. Nolan 1953

A STUDY OF THE ACTIVITIES OF AVIATION MACHINIST'S MATES IN FLEET ACTIVITIES. — Washington Univ., St. Louis, Mo. Technical Report, no. 1, [1953?]. 64 p. (Contract Nonr-816(02)). AD 34 978 UNCLASSIFIED

An evaluation was made of the Aviation Machinist's Mates curriculum in terms of actual job activities. A scope-of-activities check list was developed and administered to 216 fleet aviation machinist's mates returned for further training and, for comparison, to 50 men each in fighter and patrol training squadrons and in single and multiple engine training squadrons. (AD abstract)

2229

Webster, A. P. 1953
HIGH ALTITUDE-HIGH VELOCITY FLYING WITH SPECIAL REFERENCE TO THE HUMAN FACTORS. IV. OPENING SHOCK OF PARACHUTE DESCENTS. — Naval Medical Field Research Lab., Camp Lejeune, N. C. Vol. 4, p. 1-28, Jan. 1953 (Project Report no. NM 006 014.09.01). AD 25 025 UNCLASSIFIED

Same as the paper, Webster, A. P., 1953a.

2230

Webster, A. P. 1953a
HIGH ALTITUDE-HIGH VELOCITY FLYING WITH REFERENCE TO THE HUMAN FACTORS. IV. OPENING SHOCK OF PARACHUTE DESCENTS. — Jour. Aviation Med., 24 (3): 189-199, 207. 1953. DLC (TL555.A1A4, v. 24)

The opening shock of standard American parachutes is shown to increase directly with the fourth power of the velocity (true air speed) of the jumper when the parachute opens; to increase directly with the weight of the jumper; and to increase directly with the mass density of the air, i.e., to decrease with increase in altitude. A velocity-altitude tolerance table and chart were prepared showing a Safe Region producing 20 g or less, a Dangerous Region producing 30 g or more, and a Borderline Region producing between 20 and 30 g. (From the author's summary)

2231

Webster, J. C. 1952
A RECORDED WARBLE TONE AUDIOMETER TEST SUITABLE FOR GROUP ADMINISTRATION OVER LOUDSPEAKERS. — Jour. Speech and Hearing Disorders, 17 (2): 213-223. 1952. DAFM

Reprint issued also as: DEVELOPMENT AND USE OF THE NEL RECORDED WARBLE TONE HEARING TEST. II. Navy Electronics Lab., San Diego, Calif. Appendix D to NEL Report no. 546, Part II, Dec. 16, 1954. 11 p. AD 66 688 UNCLASSIFIED

Conventional audiometric test methods were modified to allow for simultaneous application to larger groups. The main distinguishing features of the test are: (1) loudspeakers are used instead of earphones; (2) frequency-modulated ("warble") tones are utilized instead of pure (or sine-wave) tones; (3) pulse tones are produced automatically (by phonograph record or magnetic tape); and (4) consecutive pulse tones diminish in intensity, and the test subjects' thresholds are crossed repeatedly in the course of each test, thus eliminating errors due to accidental external factors. Comparison of the group hearing test with standard individual audiometric test methods gave identical results in 90% of the cases. The test is recommended as a preliminary screening test, which is easy to apply to groups of personnel.

2232

Webster, J. C., and P. O. Thompson 1953
FACTORS AFFECTING SPEECH INTELLIGIBILITY IN AIRCRAFT CONTROL TOWERS. — Navy Electronics Lab., San Diego, Calif. NEL Report no. 357, March 10, 1953. 28 p. AD 13 397 PB 109606

Noise, intelligibility of signal, and operating fatigue were studied as related to aircraft control-tower operations. Trained air controllers were tested for ability to discern aircraft control-tower phraseology as presented in multiple-choice word listings through loudspeaker channels in each of two experimental control towers. One channel had a loudspeaker for each of six potential message sources; the other had a single loudspeaker for all six sources. The recommended modifications are: (1) use of a pull-down facility (the provision for switching radio channels singly or in combination into one loudspeaker or set of earphones); (2) use of no fewer than 3 loudspeakers in terminating 5 or more incoming radio channels; (3) establishment of a 70-db. static level for VHF receivers; and (4) location of the loudspeaker array on the ceiling to avoid obstruction of the visual field. (AD abstract)

2233

Webster, J. C., and C. Pernell 1953a
HEARING LOSSES OF AIRCRAFT REPAIR SHOP PERSONNEL. — Jour. Acoust. Soc. America, 25 (1): 188. 1953. DLC (QC221.A4, v. 25)

Abstract of a paper presented at the 44th Meeting of the Acoustical Society of America, held at Balboa Park, San Diego, California, November 13 to 15, 1952:

"The NEL [Navy Electronics Lab.] Recorded Warble-Tone test was given to 1133 overhaul and repair personnel at North Island. Using an 18-earphone monaural network, each ear was tested on the frequencies 500, 1000, 2000, 4000, and 7000 c.p.s. The population, primarily male, was considered in ten-year age groupings, and the distribution of hearing losses within these groups will be shown. Correlations between the hearing losses in the left and right ears and between the better and worse ear will be shown, as well as correlations among the hearing losses at the various frequencies."

2234

Weidmann, W. 1952
[CONSIDERATIONS CONCERNING ADAPTOMETRY, AND A NEW, SIMPLE ADAPTOMETER DEVELOPED IN ACCORDANCE WITH THESE CONSIDERATIONS] Überlegungen zur Adaptometrie und ein neues, danach entwickeltes, einfaches Adaptometer. — Klinische Monatsblätter für Augenheilkunde (Stuttgart), 121 (5): 563-573. 1952. In German. DNLM

A method of carrying out more exact dark-adaptation measurements is proposed. It is recommended to define dark adaptation by the minimum cognoscibile, i.e., the threshold of appearance, and to average out deviations of results of measurements. Automatic registration is necessary for rapid working. The eye should remain motionless, fixing the object, so that the same central region of the retina can be examined. A

new adaptometer of very simple construction responding to these requirements is described. The adaptometer and the registration apparatus form a single device. The light intensity can be altered by moving the light source. A brightness control mechanism is also included.

2235

Weiss, B., 1953
and R. F. Green
THE EFFECTS OF INERTIA ON THE ACCURACY OF KNOB SETTINGS. — Univ. of Rochester. Dept. of Psychology, N. Y. (Contract N6onr-241, Task Order 6); issued by Office of Naval Research. Special Devices Center, Port Washington, N. Y. Report no. SDC 241-6-9, Jan. 1953. ii+4 p. AD 109 235 UNCLASSIFIED

This is a study of the effect of inertia (or "flywheel effect") on the accuracy of knob adjustment without the subject being able to see the knob, but relying entirely on his kinesthetic sense. The bounderies of the "dead zone" (defined as the zone of uncertainty surrounding the correct setting of a knob) were indicated by the flashing of a neon lamp. The subjects were required to make five adjustments at each of four different dead-zone angles using one inertia value throughout. Seven inertial values and four dead zone angles (40°, 80° 120°, and 160°) were used. A total of 105 subjects were employed in the experiment. It was found that the inertial values had no significant effect on accuracy. Relative error decreased as the size of the dead zone angle increased even though the absolute error tended to increase.

2236

Weiss, B., 1953a
and S. D. S. Spragg
BUILDING "FEEL" INTO CONTROLS: THE EFFECT ON MOTOR PERFORMANCE OF DIFFERENT KINDS AND AMOUNTS OF FEEDBACK. — Univ. of Rochester. Dept. of Psychology, N. Y. (Contract N6onr-241, Task Order 6); issued by Special Devices Center, Port Washington, N. Y. Technical Report no. SPECDEVCEN 241-6-11, Oct. 14, 1953. 1+20 p. AD 92 507
UNCLASSIFIED

Some of the booster systems that are now used in aircraft completely eliminate or distort the resistance in the control that is found in older-type aircraft. This resistance, or control "feel", is sometimes held to be useful to the pilot because it may provide information that helps him to make more accurate adjustments of the control. This study reports effects of pressure changes and amount of movement on the operator's ability to control a display by means of an aircraft stick control. Performance improves as the range of distance (e.g., control stick range) available to the operator increases. Pressure feedback has no apparent effect on performance in a task which, like this one, requires the operator to predict what a certain setting of the control will do to what is being controlled. The control designer should try to provide as much distance variation as possible, since this is the crucial dimension of the force-displacement relationship, and since relative error decreases with distance. This will benefit, for the most part, the accuracy of small adjustments. The longer ones will be relatively unaffected. (Special Devices Center summary)

2237

Werner, H., 1952
and S. Wapner
EXPERIMENTS ON SENSORY-TOXIC FIELD THEORY OF PERCEPTION. IV. EFFECT OF INITIAL POSITION OF A ROD ON APPARENT VERTICALITY. — Jour. Exper. Psychol., 43 (1): 68-74. 1952. DLC (BF1.J6, v. 43)

In each of six sequences, 2 male and 2 female subjects were tested in a darkened room where the task was to adjust a luminescent rod, which could be rotated in the frontoparallel plane, so that it appeared vertical. The major variable was the starting position of the rod; it could be preset at the perpendicular, at 30° counter clockwise, and 30° clockwise. Each subject was tested under each starting position. It was discovered that the apparent vertical was always closest to the position in which the rod was initially set. Equilibration tendencies within a field which encompassed both subject and object were thought to be responsible for the result.

2238

Werner, H., 1953
S. Wapner, and J. H. Bruell
EXPERIMENTS ON SENSORY-TONIC FIELD THEORY OF PERCEPTION. VI. EFFECT OF POSITION OF HEAD, EYES, AND OF OBJECT ON POSITION OF THE APPARENT MEDIAN PLANE. — Jour. Exper. Psychol., 46 (4): 293-299. 1953. DLC (BF1.J6, v. 46)

Two experiments were carried out to investigate (a) the effect of asymmetrically placed fixated objects and (b) the effect of head torsion and of eye turning on the position of the apparent median plane. The methodology of pointing to a place in space that appeared straight-ahead (apparent median plane) was used in both experiments. It was found that the position of the apparent median plane shifted in the direction of the fixated object, i.e., in the direction of eye turning; in contrast, with eyes closed, the position of the apparent median plane shifted opposite the direction of horizontal eye turning, and opposite the direction of head torsion. These effects are interpreted to be analogous to those found previously for the perception of verticality. The study therefore provides evidence for the generality of the constructs used within the framework of sensory-tonic field theory. (Authors' abstract)

2239

Whelan, R. F., 1953
and I. M. Young
A COMPARISON BETWEEN THE EFFECTS OF ADRENALINE AND NORADRENALINE ON RESPIRATION IN MAN. [Abstract] — Jour. Physiol. (London), 119 (4): 9P-10P. 1953.
DLC (QP1.J75, v. 119)

A comparison was made of the influence of adrenaline and noradrenaline on the respiratory pattern and gaseous exchange in normal human subjects. Both drugs stimulate the respiration to a comparable degree when given intravenously at a rate of 10-20 μg/min. There is an increase in tidal volume and in respiratory minute volume and, accompanying this, a fall in the alveolar CO_2. The respiratory rate is usually, but not always, increased. The responses are characterized by the abrupt onset of the hyperpnea and a gradual diminution of the effects during the infusion period. The adrenaline infusions increased the oxygen consumption by an average of 32% (six experiments), while noradrenaline caused no consistent change. It is suggested therefore that the hyperventilation produced by adrenaline and noradrenaline is independent of any general increase in metabolic rate.

2240

Whillans, M. G. 1953
THE DEFENCE RESEARCH MEDICAL LABORATORIES: THEIR CHARACTER AND OPPORTUNITIES. — Canad. Med. Assoc. Jour. (Montreal), 68 (3): 265-268. 1953. DNLM

The organization and activities of the Defence Research Medical Laboratories and the Institute of Aviation Medicine of Canada are discussed. A close working relationship between the two organizations has developed, to the benefit of both in terms of economy and mutual availability of experts. Among the aviation-medical research projects in progress the following are noteworthy: high altitude, acceleration, safety equipment, body reactions to cold, noise, speech communication, protective clothing, nutrition and food storage, exposure to toxic agents, selection and training of personnel, and applied experimental psychology. Thus, the work performed by the Institute of Aviation Medicine exceeds in scope the limits of medical research in the narrower sense of the term.

2241

White, C. E. 1953
MEMORANDUM ON NOISE MEASUREMENT. — Naval Medical Research Lab., New London, Conn. Memorandum Report no. 53-11, July 24, 1953. 11 p. (Project no. NM 003 041.34). AD 24 347 UNCLASSIFIED

Instruments and methods for measuring noise limits encountered in working areas and audiometric testing areas are discussed. A literature review indicated that little is known concerning the long-term effects of high-intensity noise. Noise levels above 120 decibels are regarded as potential hazards, and the maximum intensity for prolonged exposure is about 85 db. for single tones or critical bands of noise. The noise-level requirements for audiometric testing areas are considered fairly stringent; a maximum background-noise level of 25-35 db. is required. The frequency composition of noise is considered in relation to its loudness, annoyance value, and its power to interfere with speech. Instruments for measuring frequency bands are listed. Progress is reported on the design and treatment of audiometric testing areas. (AD abstract)

2242

White, C. S., 1953
and N. P. V. Lundgren
EVALUATION OF A MODIFICATION OF THE BENNETT RESPIRATORY VOLUME METER. — Lovelace Foundation for Medical Education and Research, Albuquerque, N. M. (Contract AF 33(038)-13244); issued by School of Aviation Medicine, Randolph Field, Tex. Feb. 1953. iii+4 p. (Project no. 21-1402-0001, Report no. 2). AD 7466 UNCLASSIFIED

A Bennett Respiratory Volume Meter modified by addition of a totalizing scale was described and evaluated at a ground-level altitude of 5,000 feet (average barometric pressure, 630 mm. Hg). In a respiratory circuit at intermittent minute volume flows over a range of 3 to 40 liters per minute at respiratory rates of 6 to 39 the maximal error was 5%. From 15 to 40 liters per minute an accuracy of ±2% was obtained. At constant volume flows, a use for which the Bennett Meter was not intended, from 5 to 100 liters per minute the instrument consistently gave low results. Recalibration for constant-flow conditions was considered a means of improving the accuracy. The resistance of the Bennett Meter to high and low flows was found to be extremely low with a maximal pressure differential of 1.1 cm. of water existing across the meter at flows of 95 liters per minute. The dead spaces of the T-manifold and mask hose were found to be 70 and 25 ml., respectively. (Authors' summary)

2243

White, C. S., 1953a
J. H. Humm, E. D. Armstrong, and N. P. V. Lundgren
HUMAN TOLERANCE TO ACUTE EXPOSURE TO SIX PERCENT CARBON DIOXIDE IN AIR AND IN OXYGEN. — Lovelace Foundation for Medical Education and Research, Albuquerque, N. M. (Contract AF 33(038)-13244); issued by School of Aviation Medicine, Randolph Field, Tex. March 1953. iii+13 p. (Project no. 21-1402-0001, Report no. 1). AD 7492 UNCLASSIFIED

Same as item 881.

2244

White, C. S,, 1953b
J. E. Roberts, and H. W. Merideth
THE RELATION BETWEEN DENTAL OVERBITE AND AEROTITIS MEDIA. — Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex. (Contract AF 33(038)-13244); issued by School of Aviation Medicine, Randolph Field, Tex. Sept. 1953. iii+5 p. (Project no. 21-1203-0001, Report no. 7). AD 19 657 PB 112222

The various grades of dental overbite (incisal overclosure without overshoot) of 147 commercial airmen and their habitual use of the Valsalva maneuver were studied in relation to the occurrence of aerotitis. A higher incidence of aerotitis occurred among airmen with intermediate incisal overclosures and among those who routinely used the Valsalva maneuver to ventilate the middle-ear cavities during flight. Intermediate incisal overclosure is considered to influence middle ear ventilation in 3 ways: by disarrangement of the soft tissues of the Eustachian canal, by changes in bony portions of the canal, and by congenital variation of the canal. Careful indoctrination of recruits with malocclusions is emphasized. (AD abstract)

2245

White, W. J., 1953
M. J. Warrick, and W. F. Grether
INSTRUMENT READING III: CHECK READING OF INSTRUMENT GROUPS. — Jour. Applied Psychol., 37 (4): 302-307. 1953.
DLC (BF1.J55, v. 37)

Twelve subjects were used in these experiments involving instrument check readings. The following conclusions are suggested by the results of the experiments: The pointer alignment position (9, 12, 3, or 6 o'clock) has little effect on simple check reading involving the mere detection of a pointer deviation. Uniform horizontal or vertical pointer alignment facilitates instrument check reading. Pointer alignment at the 9-o'clock position is optimum for qualitative reading, as defined by the perceptual judgments and manual responses required in these experiments. Pointer modifications of the type employed in the present experiment do not accomplish a satisfactory reduction in difficulty of detecting 180-degree deviation errors. A 1 3/4-inch instrument dial appears superior to either a larger or smaller dial in terms of the number and duration of eye fixations while check reading. (From the authors' summary)

2246

Whitehorn, W. V., 1953
A. Lein, and A. Edelmann
THE GENERAL TOLERANCE AND CARDIOVASCULAR RESPONSES OF ANIMALS TO EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression ..., p. 13-22. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(b)
UNCLASSIFIED

This is a reprint of a paper which appeared in the Amer. Jour. Physiol., 147 (2): 289-298, 1946. Cats, dogs, guinea pigs and rats show excellent tolerance to explosive decompression to terminal altitude of 50,000 feet or less. In more than 700 experiments, there was only one fatality directly attributable to explosive decompression. Thoracic and abdominal distension were the outstanding responses. In a few animals small hemorrhages were found in the lungs, heart, brain, and gastrointestinal tract. Immediately following the more severe explosive decompressions, anesthetized dogs showed a drop in systemic blood pressure, bradycardia of vagal origin, and a small transient rise in cerebrospinal fluid pressure. There was no evidence of extensive bubble formation in any of the experimental animals. Binding the thorax and abdomen of dogs did not prevent the pulmonary hemorrhages that are produced by explosive decompression. (Editor's summary)

2247

Whitehorn, W. V., 1953a
A. Lein, A. Edelmann, and F. A. Hitchcock
THE EFFECT OF EXPLOSIVE DECOMPRESSION ON CEREBROSPINAL FLUID PRESSURE. — In: Ohio State Univ., Studies in explosive decompression ..., p. 23-28. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(c)
UNCLASSIFIED

This is a reprint of a paper which appeared in the Amer. Jour. Physiol., 148 (1): 253-258, 1947. The effect of both slow and explosive decompression on cerebrospinal fluid pressures of anesthetized dogs has been measured by means of a closed optical manometer system. Decompressions to 141 mm. Hg (40,000 ft.) in about 10 minutes resulted in an average rise of 3.0 mm. Hg which persisted as long as the reduced pressure was maintained. Explosive decompression from a pressure of 522 mm. Hg (10,000 ft.) to one of 141 mm. Hg (40,000 ft.) in 0.01 or 0.08 second resulted in pressure rises of 22.5 mm. Hg and 11.6 mm. Hg respectively, which persisted for only 1.5 seconds. No bubbles or evidences of bubble formation were observed in the course of these experiments. The rise in cerebrospinal fluid pressures is considered to be a reflection of a similar rise in the intrathoracic pressure. (Authors' summary)

2248

Whitehorn, W. V., 1953b
A. Lein, and F. A. Hitchcock
THE EFFECT OF EXPLOSIVE DECOMPRESSION ON THE OCCURRENCE OF INTRAVASCULAR BUBBLES. — In: Ohio State Univ., Studies in explosive decompression ..., p. 29-31. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77). AD 27 765(d)
UNCLASSIFIED

This is a reprint of a paper which appeared in the Jour. Aviation Med., 18 (4): 392-394, 1947. Animals subjected to explosive decompression and subsequent exposure to reduced barometric pressures were examined for evidence of intravascular gas bubbles. Of thirteen guinea pigs which died during such exposure, seven showed intravascular gas bubbles after recompression and autopsy. No

bubbles were found in animals surviving the exposure. It is believed that the bubbles observed may have been the result rather than the cause of the fatalities. Intravascular bubble formation is considered to be a negligible hazard in explosive decompression. (Authors' summary)

2249

Whitehorn, W. V., 1953c
A. Lein, and F. A. Hitchcock
THE EFFECT OF BINDING OF THE ABDOMEN AND THORAX ON PULMONARY LESIONS PRODUCED BY EXPLOSIVE DECOMPRESSION. — In: Ohio State Univ., Studies in explosive decompression ..., p. 39-41. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77).
AD 27 765(f) UNCLASSIFIED

This is a reprint of a paper which appeared in the Jour. Aviation Med., 18 (1): 102-104, 1947. The pulmonary hemorrhages seen in dogs decompressed over a pressure range of 435 mm. Hg at rates of pressure change of 33,650 mm. Hg (650 p.s.i.) per second or 4,800 mm. Hg (93 p.s.i.) per second are not prevented by binding the abdomen and lower thorax of these animals. It is suggested that sudden application of pressure to the walls of the alveoli, bruising them against the resistant thorax, is the primary causal mechanism for these hemorrhages rather than stretching or overexpansion of alveoli. Such a mechanism would be similar but opposite to that proposed by Zuckerman in regard to blast injuries. The value of protective clothing designed on the binding principle is questioned. (Authors' summary)

2250

Whitehorn, W. V., 1953d
A. Edelmann, and F. A. Hitchcock
THE CARDIOVASCULAR RESPONSES TO THE BREATHING OF 100 PER CENT OXYGEN AT NORMAL BAROMETRIC PRESSURE. — In: Ohio State Univ., Studies in explosive decompression ..., p. 224-228. Issued by Wright Air Development Center. Aero Medical Lab., Wright-Patterson Air Force Base, Ohio. WADC Technical Report no. 53-191, Dec. 1953. (RDO no. 696-77).
AD 27 765(x) UNCLASSIFIED

This is a reprint of a paper which appeared in the Amer. Jour. Physiol., 146 (1): 61-65, 1946. The cardiac outputs of normal male subjects were determined from ballistocardiograms. Cardiac minute volumes were consistently lower during inhalation of 100% oxygen (Linde, U. S. P.) as compared with determinations on the same subjects breathing air. Reductions in both heart rate and stroke volume contributed to this effect. Systolic blood pressure did not change, but diastolic pressure showed a slight but significant rise. The maintenance of the blood pressure level in spite of reduced cardiac output is interpreted as evidence of an increase in the general peripheral vascular resistance. It is suggested that the cardiovascular effects of oxygen inhalation be kept in mind in conditions of hyperoxygenation of the blood, such as denitrogenation, and that they may play a part in the physiological responses to changes in barometric pressure. (Authors' summary)

2251

Whiteside, T. C. D. 1953
VISION IN AN EMPTY VISUAL FIELD: CHOICE OF A COLLIMATED PATTERN. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 854, Oct. 1953. 7 p. AD 41 104
UNCLASSIFIED

Previous experiments have shown that collimated patterns placed in a subject's visual field are variously effective in making the subject focus accurately the parallel rays from optical infinity. It was the purpose of this investigation to determine whether the differences between different patterns of collimated stimuli were sufficiently great to be of practical importance. The usefulness of six collimated patterns was tested; one was a hexagon of black dots, the five others transilluminated linear and dot patterns. A selection of biconvex lenses of various focal lengths enabled the test objects and fixation pattern to be maintained at optical infinity, while they were gradually brought nearer to the subject. The least effective collimated pattern was that which simulated a cloud floor horizon. A horizontal line was found to be slightly better followed, in continuing order of improvement, by a bright vertical line, a hexagon of bright dots, and a bright cross. A hexagon of black dots was the most effective of the collimated patterns tested.

2252

Whittenberger, J. L. 1953
MECHANICAL RESUSCITATOR PROBLEMS. — In: Chem. Corps Med. Labs., Conference on artificial respiration, p. 4-9; discussion: p. 10-13. Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19, April 1953.
AD 9582 PB 109598

The following aspects of the use of mechanical resuscitators are analyzed: (1) In acute anoxia quick intervention is imperative. (2) In cases of long-range respiratory failure (e.g. polio), when the rhythm of the respiratory center and the respirator do not coordinate, adequate ventilation can be achieved by the respirator. And (3) excessive salivation, spasm of the bronchi and the glottis, changes in compliance of the respiratory structures due to different pathological conditions, all may have an effect on the function of the resuscitator. In analyzing the effect of changes in intrapulmonary pressure upon respiration, it was noted that: (1) In an animal experiment after vagotomy, full inflation and deflation required about 30 seconds. With increased pressure, the volume reached its peak at approximately 30 cm. of water. Inflation and deflation occur along quite a different pressure-volume path. (2) Ventilation at different levels of lung volume displays changes in resis-

tance (there is an increase in resistance at low volumes in patients with emphysema). And (3) excessive intrapulmonary pressures represent a potential hazard. A positive pressure of 50 mm. Hg or more is dangerous, while a relative negative airway pressure has no deleterious effects.

2253

Whittenburg, J. A. 1952

REVIEW OF THE LITERATURE ON MEASURES OF TONUS AND TENSION AS RELATED TO FATIGUE. — Univ. of Maryland, College Park. Technical Report no. 2 on Indicators of Behavior Decrement, Feb. 25, 1952. 21 p. (Contract DA-49-007-MD-222). AD 31 302 UNCLASSIFIED

A critical review was made of the literature concerning the following methods of measuring muscular tonus and tension: application of external forces; recording of slight body movements of different parts of the body; recording of changes in reflex responses; performance of voluntary movements and recording of concurrent changes in tension; recording of electrical properties of skin and muscle; and correlating physiological and behavioral indices to establish a general index of tension. The measures were evaluated in terms of validity, reliability, sensitivity, the cost involved, and the time necessary for construction and operation of the apparatus. The method involving the measurement of electrical properties of the muscles was considered to fulfill the criteria most satisfactorily, but the difficulties concerning technique and apparatus would require extensive preliminary work. Therefore, it is suggested that muscular tension and tonus be eliminated as a possible variable in the problem of behavior decrement. (AD abstract) 77 references.

2254

Whittenburg, J. A., and E. Weiss 1952a

REVIEW OF THE LITERATURE ON OLFACTORY SENSITIVITY AS AN INDICATOR OF SYSTEMIC FATIGUE. — Univ. of Maryland, College Park. Technical Report no. 6 on Indicators of Behavior Decrement, Apr. 30, 1952. 12 p. (Contract DA-49-007-MD-222). AD 31 306 UNCLASSIFIED

A critical review is presented of the literature on some important variables and techniques in olfactometry. Conditions shown to alter olfactory sensitivity are summarized, including such factors as obnoxious odors, brain tumors, drugs, diseases of the parotid gland, diurnal variation, ether, ethyl alcohol, fasting, head cold, menstruation, smoking, sugar, and supratentorial diseases. The following techniques are reviewed and briefly evaluated in terms of the variables which are related to olfactory stimulation and measurement: (1) Zwaardemaker's olfactometer; (2) Elsberg's "blast" technique; (3) Wenzel's "stream" technique; and (4) Foster's dirhinic stimulator for free or controlled sniffing. It is suggested that both "blast" and "stream" techniques be used in a preliminary investigation, in order to determine a possible relationship between systemic fatigue and olfactory sensitivity. (Authors' summary and recommendations, modified) 24 references.

2255

Whittenburg, J. A., and S. Ross. 1953

A STUDY OF THREE MEASURES OF PERCEPTUAL EFFICIENCY DURING SUSTAINED VIGILANCE. — University of Maryland, College Park. Technical Report no. 14 on Indicators of Behavior Decrement, Feb. 17, 1953. 38 p. (Contract DA-49-007-MD-222). AD 31 289 UNCLASSIFIED

Twelve female and 15 male college students and instructors were required to detect changes in the length of movement of a clock pointer which moved in discrete jumps every two seconds. Each subject was tested for a continuous two-hour session under conditions of relative isolation. Three performance measures were obtained: (a) response time (time between presentation of variable stimulus and response), (b) errors of omission (failing to detect the presence of the variable stimulus), and (c) errors of commission (responding, when in fact, no variable stimulus was presented). Mean scores for both male and female subjects showed a significant decrease in perceptual efficiency after the first half hour as measured by errors of omission. During the last hour, the female subjects made significantly fewer errors of omission than the male subjects. Errors of omission proved to be a relatively reliable measure for the male subjects but not for the female subjects. The measure involving errors of commission was of little value since contributions to this measure were made by very few subjects. The general conclusion drawn from this experiment indicates that perceptual efficiency, as measured by errors of omission and response time, may serve as useful measures of behavior decrement under conditions of sustained vigilance. (From the authors' summary)

2256

Whittenburg, J. A. 1953a

A FURTHER EXPERIMENTAL INVESTIGATION OF PERCEPTUAL EFFICIENCY DURING SUSTAINED VIGILANCE. — Univ. of Maryland, College Park. Technical Report no. 17 on Indicators of Behavior Decrement, [1953]. 40 p. (Project no. DA-49-007-MD-222). AD 31 286 UNCLASSIFIED

An attempt was made to provide information regarding the nature of the behavior that is measured in the Mackworth Clock test situation (Whittenburg, J. A., 1953), and to modify the experimental operations for the purposes of reducing individual trend differences and determining more stable functions than were found in the earlier experiment. The performance of 13 subjects under 2 experimental conditions, A (response to a variable stimulus) and B (response to both a variable stimulus and a standard stimulus), were measured by the Mackworth Clock test. Three dependent variables were employed: (1) errors of omission (fail-

ing to detect the presence of the variable stimulus); (2) critical flicker frequency (detection of changes from fused to a flickering state and the vice versa); and (3) stress experience inventory (measures of the subject's feelings concerning the experimental situations). Large differences were found in terms of the errors of omission. The analysis of the mean and variance differences for both conditions failed to reveal any systematic trends or order among the data for errors of omission. The intercorrelations between the three dependent variables suggest that the behavior being measured is possibly related to the measures in a complex manner not easily discernible from the analysis. The suggestion is made that the experimental technique using the Mackworth clock test be abondoned. (From AD abstract)

2257

Whittingham, D. G. V., and W. H. B. Ellis 1953
CONSPICUITY OF COLOURED FLUORESCENT FABRICS FOR AIR/SEA RESCUE. — Flying Personnel Research Committee (Gt. Brit.). Report no. FPRC 844, Aug. 1953. 7 p + 3 plates. AD 30746
UNCLASSIFIED

The conspicuity of several fluorescent fabrics was compared with that of the standard yellow presently used for air-sea rescue equipment. An air-sea rescue launch was employed for setting up the various targets in the sea about 7 miles offshore. An aircraft equipped with a short-range radar with an accuracy of about ±200 yards was used as the searching aircraft. Flame orange (rubberized), flame orange on cotton, neon red (rubberized), neon red on cotton, aluminum-foil cloth, and standard yellow were compared. The standard yellow was the least conspicuous of all the materials tested; rubberized flame orange material was the most conspicuous. In daytime, aluminum foil was inconspicuous because of the general background of white caps. (AD abstract)

2258

Whittingham, D. G. V. 1953a
SURVIVAL AND RESCUE. — Proc. Roy. Soc. Med. (London), 46 (7): 526-529. 1953.
DLC (R35.R7, v. 46)

Survival conditions at high altitudes differ greatly from those on the ground. Arrangement of packs, survival training, and design of equipment worn by aircrew members have to be adapted to these conditions. The contents of the packs must be arranged according to priority of use. High-energy radio transmitters worn on the body are considered of prime importance in rescue operations. The author indicates that there is a need for more physiological research, and more evidence must be obtained from actual survival conditions in order to redesign and improve existing survival and rescue equipment.

2259

Whittingham, H. E. 1953
MEDICAL ASPECTS OF AIR TRAVEL: ENVIRONMENT AND IMMUNIZATION REQUIREMENTS. — Brit. Med. Jour. (London), 1 (4809): 556-558. 1953.
DNLM

This review article on medical aspects to be considered before advising a patient to fly, is written for the general practitioner. The type of flight, the speed, the duration, and the altitude traveled are various environmental factors encountered during transit which might affect the patient's condition. Whether a patient's condition may be aggravated by anoxia, aerotitis, distension of the intestine by gases, noise and vibration, or airsickness should determine the advisability of invalid travel. The need for immunization before travel is evident.

2260

Whittingham, H. E. 1953a
MEDICAL ASPECTS OF AIR TRAVEL: MEDICAL FITNESS. — Brit. Med. Jour. (London), 1 (4810): 610-612. 1953.
DNLM

The second part of the paper covers common medical conditions which should preclude travel by air. They are: anemia, cardiovascular diseases, gastrointestinal conditions, respiratory disorders, mental disorders, and infectious diseases. Some difficulties may be experienced by travelers because of age or because of pregnancy. Statistics show that only 0.3% of the total number of passengers traveling by air suffer from diseases. Medical emergencies arise during flight among diseased passengers as well as among persons whose medical conditions were heretofore unknown. In some cases, distress due to flight is delayed up to 48 hours after travel.

2261

Wiesinger, K. 1953
[THE ROLE OF ANALYSIS OF FINDINGS IN THE RECONSTRUCTION OF AVIATION ACCIDENTS] Le rôle de l'analyse des traces dans la reconstruction des accidents d'avion. — Médecine aéronautique (Paris), 8 (1): 85-86. 1953. In French.
DLC (TL555.M394, v. 8)

Serious military airplane accidents are evaluated by a special committee in Switzerland; the members of this committee are: a police official, a flight surgeon, and a technical expert. The methods of evaluation of their findings are the same as those employed in forensic medicine. Microscopic physical, chemical, and biological examination of the findings is done by experts. The role of the flight surgeon is to collect and preserve all available evidence. -- This method seems to be of considerable value in the investigation of airplane accidents.

2262

Wiesinger, K. 1953a
[FATIGUE IN JET PILOTS] La fatigue du pilote d'avion à réaction. — Médecine aéronautique (Paris), 8 (4): 315-330. 1953. In French.
DLC (TL555.M394, v. 8)

Physiological and psychological methods as applied to the solution of the problems of fatigue

(classified as acute fatigue, chronic fatigue, and exhaustion) in general, and with regard to aviators in particular, have not been too successful. Fatigue in aviators represents a problem involving the entire personality. Differential diagnosis between neuroses and fatigue represents a delicate problem; therefore the consultation of an aviation psychiatrist is often warranted. — In the second part of the paper the relationship of fatigue and jet plane flight is being investigated in 34 pilots who had flown both propeller-driven planes and jet planes. In answering a questionnaire they specified their reactions to flight in both types of airplanes as follows: (1) The majority of the pilots estimated jet plane flight more exhausting. (2) Members of the same group felt completely fit the day after the flight but were more tired by the end of the week. (3) Fatigue was defined by all aviators as being of both physical and mental nature. (4) Among the various flying tasks, flying of a fighter plane seemed to have the most exhaustive effect. (5) Increased acceleration and emphasized mental concentration were mostly responsible for excessive fatigue in aviators. (6) The best measure against the reduction of fatigue is the use of an anti-g suit and of an oxygen mask right from the onset of flight. The role of the flight surgeon in the prevention and treatment of exhaustion in aviators is greatly emphasized.

2263

Wiesinger, K. 1953b
[THE ROLE OF SPORT IN THE SELECTION AND TRAINING OF MILITARY PILOTS] Die Rolle des Sportes bei Auswahl und Training von Militärpiloten. — Schweizerische Zeitschrift für Sportmedizin (Genève) 1: 7-11. 1953. In German. DNLM

Because it is important to obtain information on the athletic achievements of pilot candidates prior to recruitment, detailed cross examinations concerning previous sport activities are of great importance. An athletic test is given as part of the selection procedures to reveal the applicant's courage, natural skillfulness, endurance, ability of reaching quick decisions, coordination of movements, and ability of self-assessment. During and after training, pilots should devote a minimum of one afternoon of sport per week for physical conditioning. It is regretted that Switzerland has ceased to send her pilots to the Pentathlon Aéronautique International Militaire, which is a yearly international athletic contest for pilots. A brief survey on the athletic requirements for pilots in other European countries is given.

2264

Wiesinger, K. 1953c
[THE ASCENSION OF MOUNT EVEREST AS A PHYSIOLOGICAL PROBLEM] Die Besteigung des Mount Everest als physiologisches Problem. — Schweizerische Zeitschrift für Sportmedizin (Genève), 1: 44-52. 1953. In German. DNLM

Medical and physiological data of earlier expeditions to altitudes over 8000 m. are reviewed. From these data it is concluded that, above 6000 m., the detrimental effects of altitude prevail over altitude acclimatization; therefore, the expedition team should remain below this level until the highest camp is quite ready. The same team should only once be assigned to the summit attack during one expedition. The problem of oxygen storage is not yet solved. At present open oxygen tanks of light construction with compressed gas are to be used, which produce a physiological altitude equivalent to 6000 m. Above 7000 m. (or, at the most, 8000 m.), additional oxygen must be inhaled. For the summit attack, only those men should be selected who have participated in earlier expeditions to high altitudes.

2265

Wilks, S. S., 1953
and J. F. Tomashefski
CONSTRUCTION, OPERATION AND PERFORMANCE OF THE SAM RESPIRATOR. — In: Chem. Corps Med. Labs., Conference on artificial respiration, p. 82-93. Army Chemical Center. Chemical Corps Medical Labs., Md. Special Report no. 19, April 1953. AD 9582
PB 109598

The physical characteristics, weight, operability at altitude, power requirements, emergency operation, and pressure curves of the School of Aviation Medicine (SAM) portable respirator are discussed, and its efficiency tested with various groups of subjects. The following results were reached: (1) When normal subjects were asked to hyperventilate for one minute, first on air and later on 100% O_2, their normal tidal ventilation was accomplished with a pressure setting between 12 and 18 cm. of water. (2) When the SAM respirator was used on hospitalized polio patients, the analysis of arterial blood and alveolar air samples for pO_2 and pCO_2 indicated normal O_2 values, while the pCO_2 was slightly below normal. (3) When used in flight involving the evacuation of polio patients (from 3 to 15 hours) with a modified Fabricator tank (made by the Rescuator Unit of Fabricators Inc.), the patients were all comfortable. (4) When tested on anesthetized dogs, the depressive effect of the anesthetics (morphine sulfate and nembutal) induced a larger tidal volume which permitted a better sampling of alveolar air.

2266

Wilks, S. S., 1953a
J. F. Tomashefski, and R. T. Clark
PHYSIOLOGICAL EFFECTS OF CHRONIC EXPOSURE TO CARBON MONOXIDE. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. iii+8 p. (Project no. 21-1201-0013, Report no. 2). AD 25 830 PB 113263

Dogs exposed daily to carbon monoxide for periods of six months or longer show an increased tolerance to CO which is proportional to the increase in hematocrit. The increased tolerance is similar to that of altitude-acclimatized and transfused dogs. Erythropoiesis increased during the

first 30 weeks of exposure, leveling off at approximately 10 million red blood cells per cubic millimeter when exposed 6 hours daily to 0.100% CO and maintained on rations of horse meat and Purina dog chow. There was no evidence of a reversal of the alveolar-arterial oxygen-tension gradient. There was an increase in blood volume of approximately 35 percent. Altitude-acclimatized and normal transfused dogs show an increased tolerance to carbon monoxide of the same order of magnitude as CO acclimatized dogs. When there is no change in the concentration of carbon monoxide injected into the peritoneal cavity, it may be assumed that the pCO in this cavity has to have a pressure equal to that in the body fluids and alveolar spaces. (From the authors' summary)

2267

Wilks, S. S. 1953b
PHYSIOLOGICAL EFFECTS OF INJECTING HIGH CONCENTRATIONS OF CARBON MONOXIDE INTO THE PERITONEAL CAVITY OF MAMMALS. — School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. iii+4 p. (Project no. 21-1201-0013, Report no. 3). AD 25 829
UNCLASSIFIED

Animals can tolerate intraperitoneal injection of large quantities of pure CO without apparent ill effects. Five minutes after injection of CO into the peritoneal cavity, it can be detected in the alveolar air. Following the injection, there is an immediate rise of oxygen pressure in the cavity. With an injection of 500 ml. CO the oxygen pressure will rise to an approximate value of 300 mm. Hg. The oxygen pressure attains a higher value in animals subjected to hypoxic stresses than in normal animals. The oxygen pressure in the peritoneal cavity in the acclimatized animals persists longer than in normal animals. The disappearance of curves of CO in normal animals and acclimatized animals are not significantly different. The injection of CO into natural or artificial cavities offers an excellent tool in studying conditions of gaseous equilibria. It is also a simple, convenient method for acclimatizing animals to carbon monoxide. It is possible, that, as a result, (1) some protection may be provided against the effects of radiation and (2) local infections caused by anaerobic organisms may be combated. (Author's summary)

2268

Williams, D. 1953
PSYCHOLOGICAL ASPECTS OF COMBAT FLYING. — Medical Press (London), 229 (8): 181-183. 1953. DNLM

The selection of fliers for combat duty has, in the past, not been completely successful. Incidents of breakdown under stress prompted reevaluation of selection methods. Both the ability to fly well and the ability to fight while flying were found to be necessary requirements. Successful performance of duty was found to depend on the pilot's ability to overcome his fears. The type of flight duty (i.e., the danger to which a pilot was exposed) was found to be in direct proportion to the incidence of breakdown. For this reason, prevention of combat neuroses may well be effected by (1) rotation of duty, and (2) increasing the capacity to withstand fear. Good physical and mental health and expert leadership were primary factors in increasing the combat fliers' capacity to withstand fear.

2269

Williams, M. H. 1953
ALVEOLAR-ARTERIAL OXYGEN PRESSURE GRADIENT IN NORMAL DOGS. — Amer. Jour. Physiol., 173 (1): 77-81. 1953.
DLC (QP1.A5, v. 173)

The alveolar-arterial [a-a] oxygen tension gradient was measured at 3 levels of oxygenation in normal dogs. During the inspiration of room air the gradient varied from 0-29 mm. Hg, depending upon the magnitude of the alveolar ventilation. Experimental increase of alveolar ventilation caused an increase in the gradient; experimental decrease of alveolar ventilation caused a decrease in the gradient. The alveolar-arterial oxygen gradient during the inspiration of 8-10% oxygen and during the inspiration of pure oxygen was negligible. It is concluded that the a-a gradient present during the breathing of room air is due to uneven ventilation of the lungs. (Author's summary)

2270

Williams, N. E. 1953
HIGH ALTITUDE TRAINING. — In: Roddis, L. H., and J. L. Schwartz. The History of the Medical Department of the United States Navy in World War II, v. 1, p. 212-218. Office of the Surgeon General (Navy), Washington, D. C., 1953.
DLC (D807.U6A53, v. 1)

As interest in aviation increased, just preceding World War II, the use of oxygen and oxygen equipment became a necessity for all aviation personnel. In 1941, low-pressure chambers were installed at the Naval Air Station at Pensacola, Fla., and an indoctrination course in oxygen use was begun. Mobile units were procured for training in fleet units. The selection of pilots by individual tolerances to anoxia, air embolism, and low temperatures was found to be inadequate, however. By 1943, directives issued from the Bureau of Medicine and Surgery afforded more training in the use of oxygen equipment both in the altitude chamber and during flight in training aircraft. Coordination between Altitude Training Units in the field and the Oxygen and Low-Pressure Chamber Section in the Division of Aviation Medicine resulted in a more effective high altitude training program and in the inclusion of additional training activities.

2271

Willmot, R. 1953
CANADA'S GROWING RESEARCH AND DEVELOPMENT WORK. — Aviation Age, 20 (3): 27-29. 1953. DLC (TL501.A8187, v. 20)

This is a survey of the activities of Canada's Defense Research Board (DRB), which is invaluable in its cooperation with the armed forces of Canada. Much of the research conducted by the DRB is related to problems of human flight in the Arctic; the field work is done by the National Aeronautical Establishment. Some of the research carried out currently by the National Aeronautical Establishment and the RCAF comprises work on high-altitude hazards, stress associated with extreme speed in relation to the human body, and human resources and environmental protection.

2272

Wilson, C. L., 1953
W. K. Salstrom, R. R. Mackie, and D. N. Buckner
THE RELATIONSHIP BETWEEN AIRCRAFT MAINTENANCE AND FLYING SAFETY. PHASE I: A CRITERION OF MAINTENANCE ADEQUACY. — Management and Marketing Research Corp. Los Angeles, Calif.; issued by Human Factors Operations Research Labs., Bolling Air Force Base, D. C. HFORL Memo. Report no. 32, Feb. 1953. iii+53 p. AD 4983 PB 113176

This project was designed to study human factors in maintenance as they contribute to safety of flight and operational effectiveness. As a prerequisite to the study it was necessary to find a measure of maintenance level to which measures of human factors could be related for purposes of statistical analysis. Available accident, incompleted-flight ("abort"), and plane-ready-for-flight ("in-commission") rates, as presently constituted, were found unsatisfactory indicators of the state of maintenance. A system of Maintenance Quality Control (MQC) initiated by the 15th Air Force seemed, however, to provide a means of measuring maintenance level directly. A valid measure of maintenance quality can be used (1) to evaluate personnel practices such as selection, training, supervision, morale-building, etc., (2) to detect weaknesses in maintenance organizational processes and unsatisfactory material, and (3) to predict aircraft performance. (Authors' summary, modified)

2273

Wilson, D. K. 1953
SPEECH INTELLIGIBILITY RELATED TO MOTOR ACTIVITY IN HIGH LEVEL NOISE. — Speech Monographs, 20 (4): 1-7. 1953. DLC (PN4077.S6, v. 20)
Reprint issued also as: Purdue Univ. Voice Communication Lab., Lafayette, Ind., Technical Report no. SDC 104-2-27, 1953. (Contract N6ori-104, Task Order 2). AD 45 502 UNCLASSIFIED

An instrument has been developed, called the Manual-Verbal Response Tachistoscope (M-VRT) which presents stimuli relating to a psychomotor activity and measures individual performances at such a task. Tests were carried out on 168 male students. The stimulus consisted in short exposures of words from a word multiple-choice test viewed through a lighted slot. The subjects were required to zero-center manually two deflected electrical meters while reading and speaking the stimulus words. The tests were repeated following specific training in either speech intelligibility, motor performance, or intelligibility test taking. Results of the tests led to the following conclusions: (1) A complex coordinated manual task has no apparent effect upon speech intelligibility performance; (2) training in speech intelligibility leads to higher intelligibility test scores than equally long periods of training in motor performance; (3) training in intelligibility is not accompanied by an increase in motor test performance.

2274

Wilson, M. R., 1953
and H. G. Fleck
A DUAL RETINOSCOPE FOR INSTRUCTIONAL PURPOSES. — School of Aviation Medicine, Randolph Field, Tex. Special Report, May 1953. iii+3 p. AD 12 614 PB 109681

An instrument has been designed and constructed to facilitate the instruction of retinoscopy during courses in ophthalmology for aviation medical examiners and flight surgeons. By means of the dual retinoscope the instructor retinoscopist can demonstrate the various reflex movements which are seen in cases of simple hyperopia, simple myopia, simple astigmatism, compound hyperopic astigmatism, compound myopic astigmatism, and mixed astigmatism. The correction or neutralization of these errors in refraction can be demonstrated while the instructor operates the retinoscope and the student observes through the second schematic eye. (Authors' summary, modified)

2275

Wing, K. G., 1953
J. D. Harris, A. D. Stover, and J. H. Brouillette
EFFECTS OF CHANGES IN ARTERIAL OXYGEN AND CARBON DIOXIDE UPON COCHLEAR MICROPHONICS. — Jour. Compar. and Physiol. Psychol., 46 (5): 352-357. 1953. DNLM

Condensation of the report, Wing, K. G., 1952.

2276

Winquist, P. G., 1953
P. W. Stumm, and R. Hansen
CRASH INJURY EXPERIMENTS WITH THE MONORAIL DECELERATOR. — Air Force Flight Test Center, Edwards Air Force Base, Calif. AF Technical Report no. AFFTC 53-7, April 27, 1953. v+31+12 p. AD 16 297 UNCLASSIFIED

Nineteen deceleration tests were conducted on anesthetized hogs in a carriage which was suspended from a monorail, propelled by an ejector seat, and decelerated by striking a lead cone. Thirteen hogs were allowed to leave the carriage and strike an impingement block, and 6 hogs were restrained by harness straps. The range of survivable impingements was below velocities of 24

ft./sec. and kinetic energies of 1600 ft.-lb. The lower abdominal region appeared more vulnerable than the thorax; one hog survived a chest impact against the impingement block, while another hog died from a comparable abdominal impact. One hog wearing an abdominal belt was killed, while another wearing the belt survived. Three hogs survived decelerations of 130, 148, and 176 g, respectively, when each was wearing a shoulder strap, abdominal belt, and a pelvis-restraining strap. The monorail decelerator is considered a useful and economical test instrument. (AD abstract)

2277

Wright, P. E., and J. H. Braatz 1953
BOMBARDIER'S PALSY: REPORT OF A CASE — U. S. Armed Forces Med. Jour., 4 (9): 1359-1361. 1953. DLC (RC970.U7, v. 4)

A case is reported of "bombardier's palsy", a term applied to an occupational illness characterized by paralysis of the muscles supplied by the deep peroneal nerve and resulting in foot drop. This condition occurs as a result of kneeling over an aircraft bombsight for variable periods. The only aircraft in which this occurs is the B-26 (light bomber). A modified basketball knee-pad was applied to the knee to reduce the possibility of direct pressure on the nerve. It was concluded, however, that the paralysis is not due to direct pressure of the knee by a solid object, but to a stretching or tension of the nerve. Having the bombardier assume a sitting position, as practiced in all other aircraft, will avoid the disturbance.

2278

Wulff, V. J., W. J. Fry, and F. A. Linde 1953
RETINAL ACTION POTENTIAL—THEORY AND EXPERIMENTAL. — In: Electrophysiology of the visual pathway. Syracuse Univ. Inst. of Industrial Research, N. Y. Annual Report, Sept. 31 - Dec. 31, 1952. [Issued 1953?]. 25+13 p. (Contract Nonr-669(05)). AD 25 867 UNCLASSIFIED

The intermediate processes between the photochemical absorption of radiant energy and the retinal action potentials were investigated. The response magnitude and the latency of the retinal action potential elicited by a single flash of light were determined for a wide range of light intensities and flash durations for the compound eye of the grasshopper. When the eye of a grasshopper was illuminated with a short flash of light, there was a period during which nothing happened, and then a gradually developing negativity occurred which reached a crest and then declined. When the flash duration was maintained constant and the intensity was decreased, a similar series of responses with decreasing magnitude and increasing latency was obtained. The agreement between the two-factor theory for retinal processes and the data obtained from grasshopper eyes was corroborated by examination of the electrical behavior of the lateral eye of the horse-shoe crab, Limulus polyphemus and the eye of the frog, Rana pipiens. Studies of the effect of temperature on the magnitude and latency of the retinal action potential of the grasshopper suggested that: (1) tone process could not control both the latency and the magnitude; (2) the rising phase indicated by the plot of the response vs. log flash duration was controlled by a photochemical reaction; and (3) the plateau magnitude was controlled by a photochemical and a thermolabile reaction. (AD abstract)

2279

Wulfften Palthe, P. M. van 1953
NEUROPHYSIOLOGY AND AVIATION MEDICINE. — Aeromedica acta (Soesterberg, Netherlands), 2: 11-20. 1953. In English. DNLM
Also published in: Folia psychiatrica neerlandica (Amsterdam), 56 (4): 557-565. 1953. In English. DNLM

A review is presented of neuro-physiological problems arising from high speed flight. The case of a pilot is related who circled for some time at 15,000 feet, and, after making a perfect landing, was found unconscious at the controls. The collapse may have been caused by "photogenic epilepsy", or an analogous process, in that flashes from the sun were reflected by the propellers into the pilot's face at a rate of about 12 flashes per second. It is also possible "that an increased inclination to discharge of cerebral electrical activity and to fluctuations of consciousness was initiated by lack of oxygen, developing into a fit as an after-effect, when the attendant hyperpnea had induced a washing out of carbon dioxide, i.e., by a hypocapnia of longer duration than the hypoxia per se". Measurement of the electric activity of the occipital cortex in rabbits during inhalation of 4% of O_2 in 96% of N_2 (30,000 ft. simulated altitude) showed an alteration in the normal rhythm and slow waves of greater amplitude.

2280

Wulfften Palthe, P. M. van 1953a
SOMATYPING. — Aeromedica acta (Soesterberg, Netherlands), 2: 21-32. 1953. In English. DNLM

Somatyping (i.e., establishment of constitutional "types" by means of pictorial descriptions and tabulations of body measurements) is used in the Netherlands as a comparative criterium for psychological profiles developed by the Selection Board for Air Crews (S.C.V.B.). The study, which is to extend over a long period of time, covers pilot candidates, 17-22 years of age. Detailed measurements are being taken and supplemented by 4 pictures of the naked body. From these data, somatypes of the subjects are recorded on a form sheet. In the evaluation, special attention is given to hair, skin texture, structure of hands and fingers, general peculiarities of the skeleton, right- and left-handedness, nevi, café-au-lait spots, polythelia, slight deformities, and dysplasia. It is hoped that this method will lead to the compilation of a psychosomatic profile of the military and commercial pilot. It would be desirable if such a study could be conducted on an

international basis, using a uniform method. The paper reviews the three basic constitutional types (pycnic, athletic, and leptosome) developed by Pignet-Mayet, Stigter, Sheldon, and Kretschmer. A few diagnostic applications of somatyping are shown, such as discovery of neurofibromatosis in the absence of characteristic neuromata or fibromata, or correlation between onychophagy and success in flight training.

2281

Wulfften Palthe, P. M. van 1953b
[METHODS OF IDENTIFYING CASES OF LATENT EPILEPSY AND FLUCTUATING MENTAL ALERTNESS]. Onderzoekmethoden bij latente epilepsie en bij schommelingen in den aandachtsconcentratie. — Aeromedica acta (Soesterberg, Netherlands), 2: 35-47. 1953. In Dutch, with English summary (p. 47). DNLM

In aviation medicine, special attention should be paid to the identification of cases of epilepsy and allied disturbances, especially in preliminary examinations where case histories are not always available. In such instances, the Bourbon-Wiersma test for mental alertness is as useful as electroencephalographic examination, as it signalizes adequately all fluctuations of attention. It is therefore a valuable aid in predicting results of flight training. Results of the dotted-sheet test can be expressed numerically. Intermittent light flashes may reduce the degree of mental alertness. Possibly the rhythmical striking-out operations in the Bourbon test may have a similar provocative effect on epileptics during their normal periods, causing "absences", which are manifested in the need of more time per line. (Author's abstract, modified)

2282

Wulfften Palthe, P. M. van 1953c
[HYPERVENTILATION AND BLOOD SUGAR LEVEL] Hyperventilatie en bloedsuikergehalte. — Aeromedica acta (Soesterberg, Netherlands), 2: 183-209. 1953. In Dutch, with English summary (p. 208-209). DNLM

Hyperventilation and the ensuing hypocapnia may cause delta wave activity in the electro-encephalogram of normal adults having a minimal blood sugar level of 0.8 mg.%. It is not observed, under identical circumstances, when the blood sugar content is at its highest level (about 150-200 mg.%), half an hour after oral intake of 50 gm. glucose. This phenomenon is called the hyperventilation-hyperglycemia (Hv. Hg.) complex. In 10 out of 17 older concussion cases the Hv. Hg. phenomenon was positive; 5 other subjects with more recent concussions or head traumata showed a low β-rhythm, which eased up after hyperventilation, and changed to a normal α-rhythm when hyperventilation was applied half an hour after 50 gm. glucose consumption. In one case with a history of meningitis, and in another with a history of psychomotor epilepsy after encephalitis, the Hv. Hg. phenomenon was also positive. Normal EEG's were obtained by this procedure in two cases of recent mild concussions. Induced hyperglycemia tended to normalize deviating EEG's; it also had a favorable influence on clinical symptoms of akapnia and mild hypoxia (with reflex overbreathing). Pilots should be warned against flying with an empty stomach. When an acute physical or mental (emotional) stress is expected, the intake of a fair amount of sugar is advisable. (Author's abstract, modified)

2283

Wulfften Palthe, P. M. van, and C. D. de Langen 1953d
HEART ACTION, RESPIRATION, AND CORTICAL ACTIVITY IN EXTREME HYPOXIA. — Aeromedica acta (Soesterberg, Netherlands), 2: 211-221. 1953. In English. DNLM

The effects of sudden exposure to severe anoxia were studied on rabbits placed in closed boxes. Following exposure to a normal air supply, a sudden switch to pure nitrogen was made, while CO_2 accumulation was prevented. EEG's, ECG's, and pneumograms were recorded simultaneously on the encephalograph. After 4 minutes and 20 seconds of nitrogen inhalation, the respiration slowed down to 1 cycle per second. The EEG was slow with very large amplitudes. The first convulsion occurred after 4 minutes and 25 seconds. At the beginning of the 6th minute, respiration stopped and muscle tonus disappeared, but cortical activity persisted at the same amplitudes for 20 seconds, and the heart continued to give an EEG tracing. When pure oxygen was administered, apnea continued for 1 minute, and 20 seconds; the apparent (clinical) death reverted in 5 minutes to slow but regular breathing, cortical activity returned 3 minutes after the first gasp, and muscle tonus was restored. Rectal insufflation of pure O_2 increased resistance to hypoxia very little. Administration of 7 mg./kg. weight of largactil (chlorpromazine) sensitized even the anesthetized animals to hypoxia, though lowering the metabolism. A special study of the ECG showed that alterations are slight until a critical stage in hypoxia is reached. Under extreme hypoxia, the heart rate is greatly slowed down; ventricular stimulation ceases 8-10 minutes after the end of respiration; after 10 minutes, there are only auricular waves, reduced to 35-40 c.p.m., and persisting for 20 minutes after the cessation of heart-beat. When there are no more heart contractions, one can still observe an active movement in the capillaries of the sinus venosus, continuing for about 20 minutes.

2284

Wulfften Palthe, P. M. van 1953e
[REGISTRATION OF RESPIRATION ON THE ELECTRO-ENCEPHALOGRAPH BY MEANS OF STRAIN GAUGES] Ademhalingsregistratie op de electro-encephalograaf met gebruikmaking van rekstrookjes (strain gauges). — Aeromedica acta (Soesterberg, Netherlands), 2: 255-257. 1953. In Dutch, with English summary (p. 257). DNLM

Respiration can be registered with the electro-

encephalogram by means of strain gauges. Simultaneous curves are presented of the electrocardiogram, the electro-encephalogram, and the respirogram. Diagrams of the apparatus with the strain gauges and the Wheatstone bridge are given. (Author's abstract, modified)

2285

Wulfften Palthe, P. M. van 1953f
[STIMULATION OF THE NOSE INFLUENCING RESPIRATION AND HEARTBEAT (SIMULTANEOUS REGISTRATION OF HEARTBEAT, CORTICAL ACTIVITY, AND RESPIRATION)] Prikkels op de neus, die ademhaling en hartslag beinvloeden (gelijktijdige registratie van hartslag, corticale activiteit en ademhaling). — Aeromedica acta (Soesterberg, Netherlands), 2: 259-264. 1953. In Dutch, with English summary (p. 261). DNLM

A peculiar reflex phenomenon occurring among aviators consists in a sensation of suffocation, arrest of respiration, and subsequent swallowing movements, when the face is hit by a strong air stream. It is elicited by any thermo-mechanical stimulus on the central part of the upper lip and on the external portion of the nasal septum. From this receptive field, the centripetal part of the reflex path is formed by the second branch, the Gasserian ganglion, and the root of the trigeminal nerve; the efferent nerves involved are the motor part of the fifth, the glossopharyngeal, the hypoglossus, and the vagus nerves. The reflex acts also during unconsciousness and may be considered a protection against the entrance of harmful substances into the glossopharynx. The study was resumed with preliminary experiments on rabbits. Any kind of stimulus on the nose top influenced the respirogram, the electroencephalogram, and the electrocardiogram. During urethan narcosis, the arrest of breathing movements lasted longer. Stimulation of the nasal or tracheal mucosa is not essential to elicit apnea. When the animal inhaled and exhaled through a tracheal cannula, insufflated ether or cigarette smoke did not stop respiration, while stimulation of the external nasal area promptly affected breathing, heart rhythm, and cortical activity.

2286

Wyss-Dunant, E. 1953
[ACCLIMATIZATION SHOCK: OBSERVATIONS IN THE HIMALAYA] Le shock d'acclimation: observations à l'Himalaya. — Bulletin et mémoires de la Société médicale des hôpitaux de Paris (Paris), 69 (19-20): 576-608. 1953. In French. DNLM

At 5000-6000 m. altitude, the effects of altitude acclimatization prevail over those of low pressure. Headache, fatigue, insomnia, digestive disturbances, and nocturnal Cheyne-Stokes respiration disappear; the number of erythrocytes increases. At about 7000 m. the "lethal zone" begins, where acclimatization is impossible; strong will power alone may permit survival for 3-4 days, provided the caloric reserves are plentiful. The zone of 8500-8600 m. altitude represents the limit of human endurance with the protective equipment now available. Euphoric illusions induced by anoxia anesthetize the control reflexes. The subjects suffer from intense thirst, insatiable vitamin hunger, and alkalosis. Only men between 30 and 40 years of age shoud ascend to altitudes above 7500 m. Altitude tolerance can be correlated with pulse rate; individuals whose pulse rate remains stable up to 4000-5000 m. have the highest altitude tolerance.

2287

Yarnold, J. K., and E. C. Tupes 1952
THE VALIDITY OF A MEASURE OF MILITARY ATTITUDE FOR PREDICTION OF AIR FORCE SUCCESS. — Amer. Psychologist, 7 (7): 398-399. 1952. DLC (BF1. A55, v. 7)

This is a condensed version of a report delivered at the 60th annual meeting of the American Psychological Association, Washington, D. C., September 1-6, 1952. Scoring keys developed from different forms of an attitude survey and applied to aviation personnel, aviation cadets, and officer candidates, were compared, and the predictive value of such tests was ascertained. On the hypothesis that there exists a close relationship between morale and success, empirical keys were designed to predict success in various areas. These keys were found to be significantly correlated, correlation coefficients ranging from 0.75 to 0.82. Thus, reliability of prediction can be expected in such criteria as adjustment to basic training, graduation or elimination from basic pilot training, and graduation or elimination from Officer Candidate School.

2288

Yawn, E., M. Schreiber, A. V. Hardy, and R. B. Mitchell 1953
OTITIS EXTERNA. X. BACTERIOLOGICAL STUDIES OF EXTERNAL EAR INFECTIONS AMONG ARMED FORCES PERSONNEL. — Florida State Board of Health. Bureau of Labs., Jacksonville (Contract AF 33(038)-12465); and School of Aviation Medicine, Randolph Field, Tex. Nov. 1953. iii+3 p. (Project no. 21-1401-0005, Report no. 10). AD 25 828 PB 113267

A study was made of 863 diseased ears among young adult males serving at MacDill Air Force Base, Tampa, and at the Naval Air Station, Jacksonville, Florida. For purposes of this investigation, the individual ear disorders were classified into four groups: acute otitis externa, mild otitis externa, chronic otitis externa, and those other than otitis externa. The Pseudomonas organisms appeared to be the most important bacteriologic agent. Other gram-negative organisms and streptococci were apparently significant in some cases. Pseudomonas organisms were more prevalent in acute (80.8%) than in mild (24.3%) or chronic (37.5%) outer ear infections. When the primary disorder was other than otitis externa, Pseudomonas was found in only 8.6%. The occurrence of Pseudomonas organisms in normal ears was 1%. (Authors' summary and conclusions)

2289

Yeager, C. E. 1953
VIEWPOINT OF THE MILITARY TEST PILOT. — In: Haber, H. Proceedings of a Symposium on Frontiers of Man-Controlled Flight, p. 54-55. University of California. Institute of Transportation and Traffic Engineering, Los Angeles. 1953. DLC (TL670.C25, 1953)

Speeds attained by modern aircraft are so great that a pilot's natural senses do not give him sufficient information to complete a mission without the intercession of electronic equipment. As new structural materials and types of power plants are developed, pilot work loads will increase even more, unless automatic control devices are included in new design features.

2290

Zaccaria, L. 1952
RELIABILITIES OF UNSPEEDED TESTS IN THE 1947 AND 1951 AIRCREW CLASSIFICATION BATTERIES. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. 52-15, May 1952. 4 p. ATI 175974 UNCLASSIFIED

The study reported here is concerned with the estimation of reliabilities of the power tests in the 1947 and the April 1951 Aircrew Classification Batteries. The six tests included in the 1947 Aircrew Classification Battery were: (1) Arithmetic Reasoning CI206C, (2) Reading Comprehension CI614H, (3) Mechanical Information CI905B, (4) Mechanical Principles CI903B, (5) Practical Judgment CI301C, and (6) General Information CE505F. Five of the above tests were also included in the 1951 Aircrew Classification Battery. The sixth, General Information CE505F, was replaced by CE505H, a shortened form. A comparison of the computed tables indicates slightly lower reliabilities for the 1951 battery tests than for the 1947 battery tests, with the exception of Practical Judgment CI301C (0.43 and 0.41 respectively). All the tests, with the exception of one, appear to have more than adequate reliabilities. Although Practical Judgment CI301C has a lower reliability than might be desirable, its primary value lies in its unique contribution to the test battery. The existence of a judgment factor has been fairly well established, but there seems to be a need for further investigation. (From p. 1 and 2)

2291

Zachert, V., 1952f
and F. C. Ivens
FOURTEEN AIR FORCE TECHNICAL SCHOOL VALIDITY STUDIES FOR THE AIRMAN CLASSIFICATION BATTERY (AC-1B) BASED ON SAMPLES INCLUDING NEGROES AND WAF. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-4, Jan. 1952. 2+15 p. (Project no. 503-001-0001), AD 76 652 UNCLASSIFIED

A number of tables are presented listing the validities for the Airman Classification Battery (AC-1B) administered by fourteen technical schools. The validities are based on samples which include, besides white male basic airmen, Negroes and Women in the Air Force (WAF) personnel. In the past, the Airman Classification Battery has been validated on white male basic airmen only.

2292

Zachert, V., 1952g
J. C. Abt, and G. Friedman
COMPARISON OF INTERCORRELATIONS FOR THIRTEEN AIRMAN CLASSIFICATION BATTERY TESTS, SEVEN BIOGRAPHICAL INVENTORY KEYS, EIGHT APTITUDE INDEXES, AGE, AND EDUCATION FOR TWO RESTRICTED SAMPLES. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. 52-12, May 1952. 13 p. (Project no. 503-001-0006). ATI 179 728 UNCLASSIFIED

This study was initiated to determine whether or not the factorial content of the Airman Classification Battery would vary with the educational level of the sample. Two samples were selected from white male basic trainees tested at Lackland Air Force Base; one sample was composed of college graduates, the other sample consisted of subjects who had not completed more than eight years of formal education. The samples were sorted by geographic areas in the United States. Intercorrelations between the Airman Classification Battery Tests, Biographical Inventory Keys, Aptitude Indexes, age, and education were computed and tabulated. The tables show little evidence for different factor patterns resulting from wide differences in the amount of schooling. Differences in the distribution statistics are more significant and of more interest than differences between correlations. The means and standard deviations of the test scores for the college group give a clear picture of the effects of academic selection and training. (From p. 1, and authors' summary and conclusions)

2293

Zachert, V., 1952h
and F. L. Hill
THE AVIATION CADET QUALIFYING TEST, PART 3 AND 3A, COMPARED WITH THE APRIL 1951 AIRCREW CLASSIFICATION BATTERY. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-34, Nov. 1952. 6 p. (Project no. 503-002-0003). ATI 188 274 UNCLASSIFIED

Scores are compared and correlated of the Aviation Cadet Qualifying Test (ACQT) and the April 1951 Aircrew Classification Battery administered to groups of pilots, officers, and navigators. It was found that the two classification batteries give similar, though not identical, raw-score intervals when used as bases for Aviation Cadet Qualifying Test conversion tables. The Pilot scores are lower, and the Navigator scores are higher for cadets measured on the 1951 battery. The correlations between the Aviation Cadet Qualifying Test composites and the Aircrew Classification Battery stanines, although far from perfect, are high enough to indicate that the Aviation Cadet Qualifying Test is probably measuring what it has been designed to measure and that these conver-

sion tables can be used to predict success on the April 1951 Aircrew Classification Battery. (Authors' conclusion, modified)

2294

Zachert, V., 1952i
and E. H. Shibe
ACADEMIC AND NON-ACADEMIC ELIMINATION RATE BY STANINE FOR RADIO OPERATOR, GENERAL (76601) AND ELECTRONICS FUNDAMENTALS (30220) TECHNICAL SCHOOLS. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-43, Dec. 1952. 4 p. (Project no. 503-001-0001). AD 8132
UNCLASSIFIED

"Tables are presented showing the breakdown by graduates, academic eliminees, and non-academic eliminees for each stanine score of the appropriate index of airmen attending the Radio Operator, General and Electronics Fundamentals Technical Schools. These schools were selected to represent a range of validities. The sample for the Radio Operator General Technical School consisted of 2,266 students tested at Lackland Air Force Base between 7 December 1949 and 24 March 1951. The sample for the Electronics Fundamentals Technical School consisted of 3,915 students tested at Lackland and Sampson Air Force Bases between 5 January 1950 and 18 June 1951. The tables are presented in four parts with the distributions shown by frequency and by percentage." (p. 1)

2295

Zachert, V., 1952j
and F. C. Ivens
FACTOR ANALYSIS OF THE AIRMAN CLASSIFICATION BATTERY AC-1B AND THE TEXAS BATTERY. — Human Resources Research Center. [Personnel Research Lab.], Lackland Air Force Base, Tex. Research Note no. PERS 52-45, Dec., 1952. 17 p. (Project no. 503-001-0006). AD 7852
UNCLASSIFIED

Five new tests (Group A) were given to 463 airmen to aid in the identification of weak factorial areas of the AC-1B; 5 other new tests (Group B) were scored with rights (B_r) and wrongs (B_w) to aid in the isolation of a carefulness factor. Group A consisted of mathematics, physics, word fluency, controlled association, and perceptual speed tests. Group B contained plotting flexibility, plotting, numerical symbol flexibility, answer sheet marking, and estimation of length tests. Group A made the general reasoning, mechanical experience, numerical facility, perceptual speed, and word fluency factors easier to define. B_w and B_r scores were used to isolate a carefulness and a speed factor, respectively. (AD abstract)

2296

Zachert, V., 1953
and G. Friedman
JOINT CONVERSION TABLES FOR AIR FORCE CLASSIFICATION TESTS AND ARMY CLASSIFICATION TESTS. — Human Resources Research Center. Personnel Research Lab., Lackland Air Force Base, Tex. Research Bulletin no. 53-29, Aug. 1953. viii+31 p. (Project no. 503-002-0002). AD 19 463
PB 112306

Equi-percentile conversion tables were prepared between 11 Air Force airman classification battery tests and 9 Army classification battery tests. These conversions are based on common factorial content and intercorrelations. The tables are considered useful in comparing Army and Air Force scores. (AD abstract)

2297

Zaretskaîa, R. B. 1952
[THE EFFECTS OF PROSERINE AND VITAMIN B_1 ON CONE SENSITIVITY OF THE VISUAL ANALYSOR UNDER NORMAL AND PATHOLOGICAL CONDITIONS] Vliianie prozerina i vitamina B_1 na kolbochkovuiu chuvstvitel'nost' zritel'nogo analizatora v norme i patologii. — Problemy fiziologicheskoĭ optiki (Moskva & Leningrad), 10: 16-22. 1952. In Russian. DNLM (W1. PR5815, v. 10)

The influence of proserine (neostigmine) and vitamin B_1 (both cholinergic blocking agents) on color sensitivity was studied in 2 series of experiments carried out on 11 healthy individuals and on 52 glaucoma patients. Results in the healthy subjects showed an increase in sensitivity to red in 43 out of 49 cases, 20-25 minutes after the injection, and an increase in foveal sensitivity to green in 20 out of 50 cases, but to a lesser degree than for red. Injection into the conjunctival sac of one eye influenced the cone sensitivity of the other eye also, which indicates that proserine affects the central as well as the peripheral part of the visual analysor. The change in sensitivity to red is probably due to an increase in the acetylcholine content of the visual analysor tissues under the action of proserine. Administration of vitamin B_1 to 2 healthy subjects increased cone sensitivity to red, usually for a duration of 2-3 days. Sensitivity to green was not changed.

2298

Zeidner, J., 1952
J. E. Uhlaner, and D. A. Gordon
A STUDY OF THE RELATIONSHIP BETWEEN SCOTOPIC VISUAL ACUITY AT PHOTOPIC AND MESOPIC BRIGHTNESS LEVELS. [Abstract]. — Amer. Psychologist, 7 (7): 254-255. 1952.
DLC (BF1. A55, v. 7)

Visual acuity scores at various brightness levels were determined in sixteen subjects. Age range was from 24 to 44 years, median age was 31 years. Scotopic acuity was measured with the Army Night Vision Tester. Brightnesses ranged from 3.51 to 5.26 micromicrolamberts. Mesopic and photopic acuities were measured with various wall-chart tests, and targets used in a modified Ortho-Rater. Brightness levels ranged from 6.03 to 10.60 log micromicrolamberts. All testing was

conducted with corrected vision. For mesopic levels, initial dark adaptation time was ten minutes. Testing began at the lowest brightness level and progressed through a total of eight increasingly higher brightness levels. An adaptation period of 15 to 30 seconds was provided at each level before testing was initiated. Scotopic acuity scores yielded moderate positive correlations with the photopic acuity scores and substantially higher correlations with mesopic acuity scores. The stability of individual differences in scotopic acuity was demonstrated by the magnitude of these correlations based upon tests taken a year apart. Age did not contribute spurious covariance to the vision variables. These relationships indicate the feasibility of developing mesopic tests sufficiently predictive of night-vision ability. (From the abstract)

2299

*Zhukovich, A. V. 1952
[VESTIBULAR INFLUENCES ON THE ELECTROENCEPHALOGRAM OF MAN] Vestibulíarnye vliíaniía na elektroentsefalogrammu cheloveka. — Sbornik trudov po bolezníam ukha, gorla, nosa i rechi, (Leningrad), 10: 197-205. 1952. In Russian.

The electroencephalographic method was applied to the study of the central mechanism of vestibular functions. Stimulation of the vestibular apparatus in 55 subjects by rotation or heat resulted in an increase of electric activity at any part of the brain, more especially at the temples and sinciput, with increased amplitude in alpha-waves and increased number of beta-waves. After unilateral caloric stimulation of the labyrinth, the effect was felt in both hemispheres, which confirms the existence of a bilateral link between the vestibular receptors and the cerebral cortex. [Abstract in: Sovetskoe meditsinskoe referativnoe obozrenie, Bolezni ukha, gorla i nosa (Moskva), 1953 (6): 66. DNLM (ZW1. qS727a, v. 1953)]

2300

Zvorykin, V. N. 1953
[CHANGES OF HIGHER NERVOUS FUNCTIONS UNDER CONDITIONS OF ANOXIA] Izmeneniía vysshel nervnoĭ deíatel'nosti v usloviíakh razrezhennogo vozdukha. — Fiziologicheskiĭ Zhurnal (Moskva & Leningrad), 39 (6): 679-684. 1953. In Russian. DNLM

Dogs were exposed to simulated altitudes up to 8000 m. to study: (1) the main factors inducing changes in the higher nervous functions, (2) the dependence of these changes on the "nervous type" of the animal, and (3) the restoration of cortical functions after exposure to hypoxia. Conditioned salivary reflexes of 4 dogs served as indicators. A variety of changes in cortical activity were observed; they were least pronounced at 1000 m., and most conspicuous at 8000 m., particularly in dogs of the "weak nervous" type. Three characteristic stages can be distinguished: (1) A short and irregular stage of stimulation, characterized by the presence of conditioned reflexes, disinhibition of differentiations, and shortening of latent periods, followed by an "equalizing" phase. (2) A more constant phase of beginning inhibition of several positive, and disinhibition of negative conditioned reflexes; at the end of this stage a "narcotic" phase and, occasionally, an "equalizing" or a "paradoxical" phase was observed. (3) Exposure to higher altitudes (5000 to 8000 m.) resulted in a deepening of differentiations and in further inhibitions ("ultraparadoxical" and "complete inhibition" phases), even to the point of absence of unconditioned and conditioned reflexes. The observed effects are primarily due to oxygen lack and can be removed to a great extent by the administration of oxygen. Some changes in the central nervous system can be attributed to the low pressure itself (distension of gases in the stomach and intestine), which in turn affects respiration and blood pressure.

2301

Zwislocki, J. 1952b
NEW TYPES OF EAR WARDENS. — Jour. Acoust. Soc. America, 24 (4): 448. 1952. DLC (QC221.A4, v. 24)

Abstract of a paper presented at the 43rd Meeting of the Acoustical Society of America, held at New York, N. Y., May 8-10, 1952:

"On the basis of experience with previous models, new ear wardens have been developed in an effort to improve the intelligibility of speech heard through the wardens and the protection of the hearing of the wearer, and to provide him with maximum comfort. One of these wardens attenuates the whole frequency range important for hearing, one serves as a low pass filter. The choice between them depends upon the characteristics of the noise encountered and the activity of the wearer. Experiments have been carried out to assess the protection afforded under a variety of conditions in both industrial and military situations."

2302

Zwislocki, J. 1952c
NEW TYPES OF EAR PROTECTORS. — Jour. Acoust. Soc. America, 24 (6): 762-764. 1952. DLC (QC221.A4, v. 24)

In the construction of ear plugs the chief problem is to combine the necessary sound insulation with comfort and sufficient speech intelligibility. Ear plugs are described which fulfill these requirements to a reasonable degree. They can be used for the attenuation of all audible frequencies, or, with minor adaptation, as low-pass filters attenuating the more dangerous high frequencies only. For maximum speech intelligibility, both kinds of sound insulation are adequate for steady noises, whereas the low-pass filter is better for intermittent noises, detonations, and noise that can be interrupted to permit communication. Extensive experiments in industry and the Armed Forces have shown that low-pass filters with a cut-off frequency of 1000 c. p. s. provide sufficient hearing protection in most situations. (Author's summary)

2303

Zwislocki, J. 1953
ACOUSTIC ATTENUATION BETWEEN THE EARS. — Jour. Acoust. Soc. America, 25 (4): 752-759. 1953 DLC (QC221.A4, v. 25)

Among the various methods used to establish the determining factors in interaural insulation, greatest precision was obtained with the so-calle compensation method. In this method the overheard tone is canceled out by another tone of identical frequency. Bone conduction was shown to be chiefly responsible for the acoustical leakage between the ears. Conditions were determined under which interaural insulation could be increased effectively. It was found that interaural insulation is greatly enhanced when the sound is introduced into the ear through a perforated ear plug, which gives the smallest effective surface for bone conduction. The opposite ear should be left completely free. Interaural insulation can be increased by introducing a perforated ear plug deep into the bony part of the auditory meatus. This, however, causes severe pain.

2304

Zysk, J., 1953
Z. Kaleta, and J. Szamborski
[LABORATORY DECOMPRESSION CHAMBER FOR SMALL ANIMALS WITH PROVISION FOR EXTRACTING BLOOD] Laboratoryjno komora niskiśk cisnien dla malych zwierząt z przystawką do pobierania krwi. — Acta physiologica polonica (Warszawa), 4 (1-2): 69-75. 1953. In Polish, with Russian and English summaries.
DNLM (W1. AC9236, v. 4)

The authors have constructed a small decompression chamber intended to be used chiefly for experiments with rats and mice. This chamber includes a dessicator, a special apparatus for taking blood samples from the rat's tail, and a vacuum oil pump. Connecting rubber tubes provided with glass stopcocks permit continuous ventilation of the chamber. This decompression chamber offers the possibility of taking blood samples and administering intravenous injections during the entire duration of the animals' exposure to low atmospheric pressure.

conducted with corrected vision. For mesopic levels, initial dark adaptation time was ten minutes. Testing began at the lowest brightness level and progressed through a total of eight increasingly higher brightness levels. An adaptation period of 15 to 30 seconds was provided at each level before testing was initiated. Scotopic acuity scores yielded moderate positive correlations with the photopic acuity scores and substantially higher correlations with mesopic acuity scores. The stability of individual differences in scotopic acuity was demonstrated by the magnitude of these correlations based upon tests taken a year apart. Age did not contribute spurious covariance to the vision variables. These relationships indicate the feasibility of developing mesopic tests sufficiently predictive of night-vision ability. (From the abstract)

2299

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2300

Zvorykin, V. N. 1953
[CHANGES OF HIGHER NERVOUS FUNCTIONS UNDER CONDITIONS OF ANOXIA] Izmeneniia vysshei nervnoi deiatel'nosti v usloviiakh razrezhennogo vozdukha. — Fiziologicheskii Zhurnal (Moskva & Leningrad), 39 (6): 679-684. 1953. In Russian. DNLM

Dogs were exposed to simulated altitudes up to 8000 m. to study: (1) the main factors inducing changes in the higher nervous functions, (2) the dependence of these changes on the "nervous type" of the animal, and (3) the restoration of cortical functions after exposure to hypoxia. Conditioned salivary reflexes of 4 dogs served as indicators. A variety of changes in cortical activity were observed; they were least pronounced at 1000 m., and most conspicuous at 8000 m., particularly in dogs of the "weak nervous" type. Three characteristic stages can be distinguished: (1) A short and irregular stage of stimulation, characterized by the presence of conditioned reflexes, disinhibition of differentiations, and shortening of latent periods, followed by an "equalizing" phase. (2) A more constant phase of beginning inhibition of several positive, and disinhibition of negative conditioned reflexes; at the end of this stage a "narcotic" phase and, occasionally, an "equalizing" or a "paradoxical" phase was observed. (3) Exposure to higher altitudes (5000 to 8000 m.) resulted in a deepening of differentiations and in further inhibitions ("ultraparadoxical" and "complete inhibition" phases), even to the point of absence of unconditioned and conditioned reflexes. The observed effects are primarily due to oxygen lack and can be removed to a great extent by the administration of oxygen. Some changes in the central nervous system can be attributed to the low pressure itself (distension of gases in the stomach and intestine), which in turn affects respiration and blood pressure.

2301

Zwislocki, J. 1952b
NEW TYPES OF EAR WARDENS. — Jour. Acoust. Soc. America, 24 (4): 448. 1952. DLC (QC221.A4, v. 24)

Abstract of a paper presented at the 43rd Meeting of the Acoustical Society of America, held at New York, N. Y., May 8-10, 1952:

"On the basis of experience with previous models, new ear wardens have been developed in an effort to improve the intelligibility of speech heard through the wardens and the protection of the hearing of the wearer, and to provide him with maximum comfort. One of these wardens attenuates the whole frequency range important for hearing, one serves as a low pass filter. The choice between them depends upon the characteristics of the noise encountered and the activity of the wearer. Experiments have been carried out to assess the protection afforded under a variety of conditions in both industrial and military situations."

2302

Zwislocki, J. 1952c
NEW TYPES OF EAR PROTECTORS. — Jour. Acoust. Soc. America, 24 (6): 762-764. 1952. DLC (QC221.A4, v. 24)

In the construction of ear plugs the chief problem is to combine the necessary sound insulation with comfort and sufficient speech intelligibility. Ear plugs are described which fulfill these requirements to a reasonable degree. They can be used for the attenuation of all audible frequencies, or, with minor adaptation, as low-pass filters attenuating the more dangerous high frequencies only. For maximum speech intelligibility, both kinds of sound insulation are adequate for steady noises, whereas the low-pass filter is better for intermittent noises, detonations, and noise that can be interrupted to permit communication. Extensive experiments in industry and the Armed Forces have shown that low-pass filters with a cut-off frequency of 1000 c. p. s. provide sufficient hearing protection in most situations. (Author's summary)

2303

Zwislocki, J. 1953
ACOUSTIC ATTENUATION BETWEEN THE EARS. — Jour. Acoust. Soc. America, 25 (4): 752-759. 1953 DLC (QC221.A4, v. 25)

Among the various methods used to establish the determining factors in interaural insulation, greatest precision was obtained with the so-calle compensation method. In this method the overheard tone is canceled out by another tone of identical frequency. Bone conduction was shown to be chiefly responsible for the acoustical leakage between the ears. Conditions were determined under which interaural insulation could be increased effectively. It was found that interaural insulation is greatly enhanced when the sound is introduced into the ear through a perforated ear plug, which gives the smallest effective surface for bone conduction. The opposite ear should be left completely free. Interaural insulation can be increased by introducing a perforated ear plug deep into the bony part of the auditory meatus. This, however, causes severe pain.

2304

Zysk, J., 1953
Z. Kaleta, and J. Szamborski
[LABORATORY DECOMPRESSION CHAMBER FOR SMALL ANIMALS WITH PROVISION FOR EXTRACTING BLOOD] Laboratoryjno komora niskiśk cisnien dla malych zwierząt z przystawką do pobierania krwi. — Acta physiologica polonica (Warszawa), 4 (1-2): 69-75. 1953. In Polish, with Russian and English summaries.
DNLM (W1. AC9236, v. 4)

The authors have constructed a small decompression chamber intended to be used chiefly for experiments with rats and mice. This chamber includes a dessicator, a special apparatus for taking blood samples from the rat's tail, and a vacuum oil pump. Connecting rubber tubes provided with glass stopcocks permit continuous ventilation of the chamber. This decompression chamber offers the possibility of taking blood samples and administering intravenous injections during the entire duration of the animals' exposure to low atmospheric pressure.

INDEXES

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Roman numerals indicate volume number; arabic numerals refer to item numbers.

A key is provided (p. 307) to identify references in volume I by their item numbers.

KEY TO SUBJECT INDEX HEADINGS

IN VOLUME I

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